Fossil Dinoflagellates: Index to Genera and Species, 1985 Edition

J. K. Lentin and G. L. Williams

Atlantic Geoscience Centre
Geological Survey of Canada
Department of Energy, Mines and Resources

Bedford Institute of Oceanography
P.O. Box 1006
Dartmouth, Nova Scotia B2Y 4A2

July 1985

Canadian Technical Report of
Hydrography and Ocean Sciences
No. 60

Canada

86-0913/

Canadian Technical Report of Hydrography and Ocean Sciences

These reports contain scientific and technical information of a type that represents a contribution to existing knowledge but which is not normally found in the primary literature. The subject matter is generally related to programs and interests of the Ocean Science and Surveys (OSS) sector of the Department of Fisheries and Oceans.

Technical Reports may be cited as full publications. The correct citation appears above the abstract of each report. Each report will be abstracted in Aquatic Sciences and Fisheries Abstracts. Reports are also listed in the Department's annual index to scientific and technical publications.

Technical Reports are produced regionally but are numbered and indexed nationally. Requests for individual reports will be fulfilled by the issuing establishment listed on the front cover and title page. Out of stock reports will be supplied for a fee by commercial agents.

Regional and headquarters establishments of Ocean Science and Surveys ceased publication of their various report series as of December 1981. A complete listing of these publications and the last number issued under each title are published in the *Canadian Journal of Fisheries and Aquatic Sciences*, Volume 38: Index to Publications 1981. The current series began with Report Number 1 in January 1982.

Rapport technique canadien sur l'hydrographie et les sciences océaniques

Ces rapports contiennent des renseignements scientifiques et techniques qui constituent une contribution aux connaissances actuelles mais que l'on ne trouve pas normalement dans les revues scientifiques. Le sujet est généralement rattaché aux programmes et intérêts du service des Sciences et Levés océaniques (SLO) du ministère des Pêches et des Océans.

Les rapports techniques peuvent être considérés comme des publications à part entière. Le titre exact figure au-dessus du résumé du chaque rapport. Les résumés des rapports seront publiés dans la revue Résumés des sciences aquatiques et halieutiques et les titres figureront dans l'index annuel des publications scientifiques et techniques du Ministère.

Les rapports techniques sont produits à l'échelon régional mais sont numérotés et placés dans l'index à l'échelon national. Les demandes de rapports seront satisfaites par l'établissement auteur dont le nom figure sur la couverture et la page de titre. Les rapports épuisés seront fournis contre rétribution par des agents commerciaux.

Les établissements des Sciences et Levés océaniques dans les régions et à l'administration centrale ont cessé de publier leurs diverses séries de rapports depuis décembre 1981. Vous trouverez dans l'index des publications du volume 38 du *Journal canadien des sciences halieutiques et aquatiques*, la liste de ces publications ainsi que le dernier numéro paru dans chaque catégorie. La nouvelle série a commencé avec la publication du Rapport n° 1 en janvier 1982.

Canadian Technical Report of

Hydrography and Ocean Sciences No. 60

July 1985

FOSSIL DINOFLAGELLATES: INDEX TO GENERA AND SPECIES, 1985 EDITION

by

J.K. Lentin* and G.L. Williams

Atlantic Geoscience Centre
Geological Survey of Canada
Department of Energy, Mines and Resources

Bedford Institute of Oceanography
P.O. Box 1006
Dartmouth, Nova Scotia
Canada B2Y 4A2

*L.I.B. Consultants, 715 4th St. N.W., Calgary, Alberta

©Minister of Supply and Services 1985
Cat. No. Fs 97-18/60E ISSN 0771-6764

Correct citation for this publication:

Lentin, J.K. and Williams, G.L. 1985. Fossil dinoflagellates: Index to genera and species, 1985 edition. Can. Tech. Rep. Hydrogr. Ocean Sci. 60: x + 451p.

ABSTRACT

Lentin, J.K. and Williams, G.L. 1985. Fossil dinoflagellates: Index to genera and species, 1985 edition. Can. Tech. Rep. Hydrogr. Ocean Sci. 60: x + 451 p.

The Index alphabetically lists all dinoflagellate cyst taxa at and below the generic rank, and known to the authors as of April 1, 1985: it includes 461 genera, 2536 species, 186 subspecies, and 4 varietates. Also listed are 88 generic names no longer considered legitimate. One hundred and two new combinations are proposed, as well as 3 new names for junior homonyms and 3 changes of rank. New combinations are cross-referenced to the basionym and other combinations. All papers referenced in the text are included in the bibliography.

RÉSUMÉ

Lentin, J.K. and Williams, G.L. 1985. Fossil dinoflagellates: Index to genera and species, 1985 edition. Can. Tech. Rep. Hydrogr. Ocean Sci. 60: x + 451 p.

Le répertoire est une liste en ordre alphabétique des taxons dinokystes fossiles au rang générique et sous ce rang, incluant ceux signalés par les auteurs au 1 avril 1985; il comprend 461 genres, 2536 espèces, 186 sous-espèces, et 4 variétés. On y trouve aussi 88 noms génériques, qui ne sont plus utilisés. On propose 102 nouvelles combinaisons, ainsi que 3 nouveaux noms pour les homonymes de rang inférieur et 3 changements de rang. On renvoie les nouvelles combinaisons au "basonyme" et aux autres combinaisons. Tous les articles mentionnés dans le texte sont inscrits dans la bibliographie.

TABLE OF CONTENTS

Page

Abstract.......... iii

Introduction.......... v

Acknowledgements.......... x

Index to Genera and Species.......... 1

Index of Calcareous Dinoflagellates.......... 377

Appendix.......... 391

Bibliography.......... 397

INTRODUCTION

This fourth edition of the Index documents the continuing increase in fossil dinoflagellates. The first edition, published in 1973, listed 292 genera and 1328 species. In the second edition, issued in 1977, the number of taxa had risen to 342 genera and 1700 species. The 1981 edition referenced 413 genera and 2210 species. This latest version lists 461 genera, plus 88 no longer considered legitimate, and 2536 species. The present update endeavours to provide a current listing of all dinoflagellate cyst genera and species included in publications available to the authors as of April 1, 1985. Although most of the taxa listed are fossil, we have included a few Recent dinoflagellates whose equivalent molite stage is unknown or uncertain. There is one significant change in format. Because of the recent upsurge in studies of fossil calcareous dinoflagellates, we have listed this group in a separate section of the Index.

Dinoflagellates have been described both as animals, necessitating their classification under the International Code of Zoological Nomenclature (I.C.Z.N.), and as plants which are subject to the International Code of Botanical Nomenclature (I.C.B.N.). Since a preponderance of species are autotrophic (synthesizing organic compounds from inorganic substances and containing chlorophyll like the green plants), dinoflagellates are regarded by botanists as plants, constituting the Class Dinophyceae within the Division Pyrrhophyta of the Algae. Throughout this Index, as in previous editions, they are regarded as plants and therefore the articles and recommendations of the I.C.B.N. have been applied to their nomenclature.

The format for this Index follows that introduced by Lentin and Williams, 1973. The genera are arranged in alphabetical order and presented in boldface. The species and subspecies are also listed alphabetically within the genera and the species respectively. Taxa considered invalid, illegitimate or junior synonyms are denoted by quotation marks. For clarity and simplicity the abbreviated generic name is not repeated before each species, but the tabulated species names are indented so that no confusion will result from this omission. This practice is acceptable under Article 33, paragraphs 1-2 of the I.C.B.N. which allows, "...any topographical device which indicates that an epithet is associated with a particular generic or other name."

The species list includes the author, date, page number, plate and figure numbers for each species which remains within the original generic assignment. For species which have been assigned to a genus by later transfer, the author, date and page number of the first valid transfer are listed, and citation of the original description is included in parentheses if the species is now currently assigned to that genus. When further transfer has been affected the complete citation of the original description is included in parentheses only for that genus to which the species is now validly assigned.

In cases where a species has been assigned to more than two genera, the first generic name given is that of the original combination and is preceded by the term

"Originally". The next generic assignment is denoted by the term "subsequently". Further generic assignments are ordered according to chronologic occurrence. Thus for *Pterodinium cingulatum* (O. Wetzel, 1933b) Below, 1981a, the index would state: Originally *Cymatiosphaera;* subsequently *Hystrichosphaera*, then *Spiniferites*. Where a species has previously been assigned to only one other genus, reference to that genus will be preceded by the term "formally". If a species has been transferred out of the genus under which it is listed, the specific name is given in quotation marks and its current generic assignment is listed. The age appearing with each specific name is that of the type material. Every attempt has been made to cross reference all names for species and taxa of lower rank which have been included within two or more genera. We also attempt to cross-reference all junior and senior synonyms in this edition: we would appreciate being made aware of any omissions or oversights in this indexing.

One exception to the author citation is Jiabo, 1978. This reference is a joint publication by several authors, including Sung Zhi-chen, He Cheng-quan, Qian Ze-shu, Pan Zhao-rin, Zheng Guo-guang and Zheng Yue-fang. The word Jiabo represents a collective name for the authors. We were informed by He Cheng-quan, prior to publication of the 1981 index, that the individual contributions should be recognized. According to He, *Bohaidina* Jiabo should preferably be cited as *Bohaidina* Sung, He, Qian, Pan, G.G. Zheng and Y.F. Zheng, in Jiabo, 1978. Unfortunately, we cannot accede to this request since we must maintain the integrity of the original, which cites the authorship as Jiabo.

Although the present authors try to avoid detailed discussion of taxonomic papers, the magnitude of Stover and Evitt, 1978 and their adopted format demand some comment. For individual genera, these authors recognized: "type species"; "other accepted species"; "provisionally accepted species"; and "problematical species". These groupings, which are concisely defined by Stover and Evitt, *op.cit.* are treated as follows in the Index. All "accepted species" are listed without reference to Stover and Evitt, *op.cit.* "Provisionally accepted species" are preceded by a question mark (?) with a note that Stover and Evitt, *op.cit.* considered each to be a "provisionally accepted species". The "problematical species" are listed without preface but are followed by the note that Stover and Evitt considered each to be a "problematical species". This approach has been adopted for subsequent papers such as Sarjeant, 1982. We also provide a full citation for the originating author of a questionable generic assignment.

In addition to describing several new genera, Stover and Evitt, 1978 emended several, and also provided "synopses" or "modified descriptions" for most (this practise is being followed by other authors). The latter two headings are not mentioned in the Index. It is our recommendation that the opinion of Stover and Evitt and other authors adopting the same format, be closely adhered to in the determination of whether a generic diagnosis has been changed sufficiently to warrant the notation emend. in accordance with the I.C.B.N. Art. 47. By not following this course of action, considerable confusion may result in the determination of the correct circumscription for many genera.

Occasional comments on taxonomic problems are included immediately after the generic or specific entry. One such example is the status of *Meiourogonyaulax* Sarjeant, 1966b, and its contained species. Gocht, 1975, p.353 considered this genus to be a junior synonym of *Lithodinia* Eisenack emend. Gocht. He did not, however, effect any formal transfer of species. Subsequently Gocht, 1976, p.334 invalidly (Stafleu, personal communication) transferred several species of *Meiourogonyaulax* to *Lithodinia*. Lentin and Williams, 1977b, at the request of Hans Gocht, validly transferred the species of *Meiourogonyaulax* to *Lithodinia*. Stover and Evitt, 1978, p.62-63, however, retained the genus *Meiourogonyaulax*, differentiating it from *Lithodinia* on the nature of the archeopyle: in the latter genus, the individual paraplates of the operculum are free. In this and the 1981 issue of the Index, we have accepted the opinion of Stover and Evitt and retained both *Lithodinia* and *Meiourogonyaulax*.

Lentin and Williams, 1973 (p.3-5) discussed the infraspecific classification currently used for fossil dinoflagellates, and recommended that the terms subspecies, variety and forma not be used indiscriminately. Their definitions for these infraspecific categories have been maintained in the present Index. This has necessitated the raising of infraspecific taxa previously described as varietates to the subspecies level, thus creating a "*stat. nov.*" or *status novus*. Sarjeant, 1976c (p.10) stated: "In my opinion, the name 'subspecies' carries evolutionary overtones that make its application inappropriate to the forms here treated with. I recognise that the definition of subspecies in the International Code of Botanical Nomenclature carries no such implications; but I prefer to apply the term 'subspecies' either to members of a population exhibiting a morphological feature whose development appears likely to link that species with another, or to geographically or stratigraphically isolated populations, all of whose members show a slight, but consistent, difference from typical forms." Lentin and Williams, 1977b did not concur with Sarjeant's reasoning, which was based upon the recognition of evolutionary overtones. Bestowing such a connotation upon the subspecies, they reasoned, would lead to several erroneous conclusions. These authors therefore retained the variety only in the sense of Lentin and Williams, 1973, a course of action which is pursued in this present version of the Index.

It has always been the policy of the present authors to adhere to the International Code of Botanical Nomenclature. There is, however, one notable exception. Article 26 states that the author's name does not follow the citation of a subspecies name. Thus *Deflandrea phosphoritica* Eisenack subsp. *australis* Cookson and Eisenack var. *lata* Vozzhennikova is correctly written as *Deflandrea phosphoritica* Eisenack *australis lata*. Although we are cognizant of Article 26, we have provided full author citations for all intraspecific taxa in this and earlier versions of the Index. Any other course of action, in our view, would deny the reader access to relevant and necessary information.

An additional difficulty resulting from Article 26 is the realization that each species has a subspecies with the same name and holotype; this subspecies is known as an autonym. In the Index, the autonym is not noted unless other subspecies have been added to a species. This is a commonly accepted procedure. Thus the species *Oligosphaeridium complex* (White) Davey and Williams has the autonym *O. complex* (White) Davey and Williams *complex* because there exists the subspecies *O. complex brevispinum*. Since the autonym has never been used in the literature, it does not appear in this index. Only when it has appeared in the literature is the autonym included as with *Deflandrea phosphoritica* Eisenack *phosphoritica*. This policy, we feel, avoids unnecessary duplication while making the index easier to use.

A major responsibility in compiling an index is the necessity to provide correct orthography. We are indebted to Jan Jansonius for the correction of over 300 such errors which appeared in the first draft of Lentin and Williams, 1977b. One such example was *Canningia ringnesii* Manum and Cookson, 1964, named in honour of the Ringnes brothers who helped finance the second "Fram" expedition. The correct orthographic representation of this species therefore is *Canningia ringnesiorum* Manum and Cookson, 1964. The species *Chatangiella bondarenkii* (Vozzhennikova, 1967) Lentin and Williams, 1976 named after the palynologist N.M.Bondarenko, is now listed as *Chatangiella bondarenkoi* (Vozzhennikova, 1967) Lentin and Williams, 1976. In the present Index, we are indebted once more to Jan Jansonius for additional orthographic corrections. In the task, we have also been ably assisted by Rob Fensome.

The first valid publication of a genus is not always immediately apparent. Lentin and Williams, 1973 (p.84) argued that *Kisselovia* Vozzhennikova, 1963, was a *nomen nudum*, the correct citation being *Kisselevia* Vozzhennikova, 1967. They based their conclusion on the failure of Vozzhennikova, 1963 to designate a holotype for the type of the genus. F.A. Stafleu (personal communication) confirmed that the correct orthography is *Kisselovia* Vozzhennikova, 1963. He stated: "A type cannot be validly published, only a name can be. Art. 37 says exactly what it means. In other words a type species indication of a genus may be to an invalidly published name, e.g. to a pre-starting point name of a species (see e.g. Code p.243, under the rejected homonym *Martensia*.")

Arguments concerning the advantages and disadvantages of the "dual system" of classification for motile dinoflagellates and dinoflagellate cysts are beyond the scope of this Index. The dual system has arisen from the independent study of dinoflagellate motile and cyst stages by neontologists and paleontologists respectively. Only in the last few years has the relationship of the two stages in the life cycle become apparent, especially where morphologically dissimilar cysts and thecae represent the same species. Reid, 1974 (p.583-584) presented several excellent arguments for retention of the dual system of classification. Within the Index we are not concerned with suprageneric classification, but only whether generic and specific dinoflagellate cyst names should be retained, where they are congeneric or conspecific with motile genera and species. We agree with Reid, *op.cit.* that for the present retention of a dual system of classification is preferable. The ultimate retention or rejection of this can be decided only after joint consultation of neontologists and paleontologists working together.

Definition of the taxonomic terms and symbols used herein are as follows:

I.C.B.N.: International Code of Botanical Nomenclature

I.C.Z.N.: International Code of Zoological Nomenclature

comb.nov., *combinatio nova:* Latin, new combination; a combination validly published for the first time

emend., *emendatus, -a, -um:* Latin, altered (by); indicates a change in circumscription of a taxon

jr hom., *junior homonym:* the latter published of two homonyms

jr syn., *junior synonym:* the latter published of two synonyms

nom.nov., *nomen novum:* Latin, new name; a new name replacing a junior homonym

nom.nud., *nomen nudum:* Latin, naked name; a name published without such associated descriptive matter as is required by the I.C.B.N. to satisfy the criteria of valid publication

nom.subst., *nomen substitum:* Latin, substitute name; a replacement name for a junior homonym

non: Latin, not

sp. nov., *species nova:* Latin, new species; a species validly published for the first time

stat. nov., *status novus:* Latin, new status; used to indicate that a taxon has been altered in rank but retains in its name the epithet from its name in the former rank. For purpose of author citation, *stat. nov.* is treated as *comb. nov.*

subsp., *subspecies:* Latin, subspecies

var, *varietas:* Latin, variety, variant

*: type species of the genus

"...,: indicates epithet now correctly used in another combination or a taxon considered to be a *jr syn.*

N.I.A. Noun in apposition

O.C.: Orthographic change

op.cit., *opere citato:* Latin, previously referred to

ACKNOWLEDGEMENTS

The authors are indebted to Jan Jansonius for concise interpretation of the I.C.B.N. and for the correction of numerous orthographic errors. The new format of the index, with the section on calcareous dinoflagellates, primarily reflects the efforts of Dr. Helmut Keupp, who unstintingly and conscientiously reviewed that section. We thank him most sincerely for his efforts. Thanks are also extended to V.J. Williams for the demanding task of proof reading and to E.H. Davies for helpful advice during the compilation stages. We are especially grateful to Jan Jansonius and Rob Fensome, the critical readers; it would have been impossible to produce the Index without their constant guidance, constructive criticism and encouragement. We would like to acknowledge our indebtedness to Nelly Koziel who, expertly and without any complaint, typed the numerous versions of the manuscript.

Finally we are grateful to the Geological Survey of Canada and L.I.B. Consultants, Ltd. who shared the expense of this venture.

A

ACANTHAULAX Sarjeant, 1968, p.227 (*nom. subst. pro Acanthogonyaulax* Sarjeant,1966b, p.132); emend. Sarjeant, 1982, p.46. Helenes, 1984, p.116 suggested that *Acanthaulax* may be a *jr syn.* of *Cribroperidinium*.

"acanthosphaera" (Sarjeant, 1961a) Sarjeant, 1968, p.227. NOW *?Meiourogonyaulax*.

?aceras (Eisenack, 1958, p.391, pl.21, fig.1-2) Stover and Evitt, 1978, p.137. Aptian. Originally *Gonyaulax;* subsequently *Leptodinium*. Stover and Evitt, 1978, p.137 considered this to be a "provisionally accepted species" of *Acanthaulax*.

"aculeata" (Klement, 1960) Stover and Evitt, 1978, p.137. NOW *Occisucysta*. Originally *Gonyaulax;* subsequently *Gonyaulacysta*. Lentin and Williams, 1981, p.1 rejected the transfer of this species to the genus *Occisucysta* Gitmez by Below, 1981a, p.60. Since the holotype has a 2P archeopyle (Stover, pers. comm.), however, we herein accept the transfer of Below, *op. cit.*

"angulosa" (Gitmez, 1970, p.252, pl.2, fig.4-5; text-fig.7a-b) Stover and Evitt, 1978, p.137. NOW *Meristaulax;* formerly *Gonyaulacysta*. This species was considered a *jr syn.* of *Cribroperidinium granulatum* (Klement) Stover and Evitt by Fisher and Riley, 1980, p.321. Sarjeant, 1984a, p.160 rejected the synonymy.

"areolata" (Sarjeant, 1964a). See *Acanthaulax scarburghensis*.

"compta" (Duxbury, 1980) Sarjeant, 1982, p.47. NOW *Apteodinium*. Originally *Gonyaulacysta;* subsequently *Cribroperidinium*.

crispa (W. Wetzel, 1967, p.870, pl.15, fig.4a-b) Woollam and Riding, 1983, p.3. Middle Jurassic. Originally *Gonyaulax;* subsequently *Gonyaulacysta*, then *Hystrichogonyaulax*. See also *Cribroperidinium*.

?downiei (Sarjeant, 1960a, p.138; holotype illustrated by Downie, 1957, pl.20, fig.10) Sarjeant, 1976c, p.6. Kimmeridgian; formerly *Baltisphaeridium*. See also *Cyclonephelium*. Stover and Evitt, 1978, p.137 considered this to be a "provisionally accepted species". Sarjeant, 1982, p.47 stated explicity that *A. downiei* "has a single-plate (3") precingular archeopyle".

?paliuros (Sarjeant, 1962a, p.260, pl.1, fig.7; text-fig.5) Sarjeant, 1968, p.227-228. Oxfordian; formerly *Gonyaulax*. Stover and Evitt, 1978, p.137 considered this to be a "provisionally accepted species" of *Acanthaulax*.

***ACANTHAULAX* (cont'd)**

scarburghensis (Sarjeant, 1964) *comb. nov.*
1964 *Gonyaulacysta scarburghensis* Sarjeant, p.472-473, *nom. nov. pro Gonyaulax areolata* Sarjeant, 1961a, p.95-96, pl.13, fig.13; text-fig.5; *non Gonyaulax areolata* Kofoid and Michener, 1911. Late Callovian-Early Oxfordian. Riley and Fenton, 1982, p.199 made an illegitimate transfer of this species to *Acanthaulax* by using the illegitimate name *Gonyaulax areolata* Sarjeant, 1961a, thus failing to conform to the rule that the oldest legitimate epithet is transferred to a new generic name (I.C.B.N. Art. 55). *Gonyaulax areolata* was illegitimate when erected, so that *Gonyaulacysta scarburghensis* is the oldest legitimate epithet for the species.

senta Drugg, 1978, p.62, pl.3, fig.13; pl.4, fig.1-3. Oxfordian. Riley and Fenton, 1982, p.119 and Woollam and Riding, 1983, p.3 stated that *Acanthaulax senta* may be conspecific with *Gonyaulacysta scarburghensis* Sarjeant.

"*?spinosissima*" (Deflandre, 1938b) Sarjeant, 1972, p.22. NOW *?Pareodinia;* originally *Palaeoperidinium*. At the time of the transfer, Sarjeant, *op. cit.* questionably included this species in *Acanthaulax*.

**venusta* (Klement, 1960, p.44-45, pl.5, fig.10-13; text-fig.22) Sarjeant, 1968, p.227. Middle Oxfordian to Kimmeridgian; formerly *Gonyaulax*. Lentin and Williams, 1973, p.9 rejected the transfer of this species to *Gonyaulacysta* by Dodekova, 1971, p.11. Helenes, 1984, p.116 suggested that *A. venusta* may be a synonym of *Cribroperidinium* (now *Meristaulax) granulatum* (Klement) Stover and Evitt.

wilsonii Yun, 1981, p.7-8, pl.1, fig.2-3,6-7a-b. Early Santonian.

"*ACANTHOGONYAULAX*" Sarjeant, 1966b, p.132, *non Acanthogonyaulax* Kofoid, 1911. See *Acanthaulax* Sarjeant, 1968.

ACHILLEODINIUM Eaton, 1976, p.234. The contention by Duxbury, 1980, p.119 that *Achilleodinium* is a *jr syn.* of *Florentinia* was rejected by Lentin and Williams, 1981, p.1 because of the distinctive wall structure of *Achilleodinium*. See also Duxbury, 1983, p.46. Below, 1982c, p.7 also considered *Achilleodinium* to be a *jr syn.* of *Florentinia* which we herein reject for the reason given above.

**biformoides* (Eisenack, 1954, p.68, pl.11, fig.16-20) Eaton, 1976, p.234. Late Eocene-Early Oligocene. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium,* then *Hystrichokolpoma*. The transfer of this species to *Florentinia* by Duxbury, 1980, p.121 was rejected by Lentin and Williams, 1981, p.2.

fibrapendiculum Islam, 1983b, p.335, pl.1, fig.1-3; text-fig.5. Middle Eocene.

***ACHILLEODINIUM* (cont'd)**

latispinosum (Davey and Williams, 1966b, p.88, pl.5, fig.8) Bujak *et al.*, 1980, p.26. Early Eocene; formerly *Cordosphaeridium*. The provisional transfer of this species to *Tityrosphaeridium* by Sarjeant, 1981, p.121 is herein rejected.

ACHOMOSPHAERA Evitt, 1963, p.163. We do not follow Duxbury, 1983, p.54-55 and others in considering this genus a *jr syn.* of *Spiniferites*.

alcicornu (Eisenack, 1954, p.65, pl.10, fig.1-2; text-fig.5) Davey and Williams, 1966a, p.50. Oligocene; formerly *Hystrichosphaeridium*. May, 1980, p.64 suggested that this species is conspecific with *Spiniferites pseudofurcatus*. Lentin and Williams, 1981, p.2 rejected this suggestion. See also *Galea lychnea* and *Hystrichosphaeridium leptodermum* which are *jr synonyms* of this species.

andalousiensis Jan du Chêne, 1977, p.112, pl.1, fig.1-4. Late Miocene (Andalusian).

bulla Cookson and Eisenack, 1974, p.55, pl.23, fig.13. Paleocene.

callosa Matsuoka, 1983b, p.128-129, pl.11, fig.6-8; text-fig.15. Pliocene.

"*cambra*" (Sah *et al.*, 1970). Jain, 1982, p.51 considered this species to be a *jr syn.* of *Spiniferites multibrevis*. For full citation see *Spiniferites cambrus*.

"*communis*" (Corradini, 1973) Sarjeant, 1981, p.122. The transfer of this species to *Achomosphaera* by Sarjeant, *op.cit.* is herein rejected and the species is retained in *Cordosphaeridium*.

?convexa Sah *et al.*, 1970, p.145-146, pl.1, fig.12-13. Late Cretaceous. Stover and Evitt, 1978, p.139 considered this to be a "provisionally accepted species".

"*?cracenospinosa*" (Davey and Williams, 1966b) Sarjeant, 1981, p.123. The transfer of this species to *?Achomosphaera* by Sarjeant, *op.cit.* is herein rejected and the species is retained in *?Cordosphaeridium*.

crassipellis (Deflandre and Cookson, 1955, p.265, pl.6, fig.2-3; text-fig.20) Stover and Evitt, 1978, p.138. Early Eocene. Originally *Hystrichosphaera*; subsequently *Spiniferites*.

danica (W. Wetzel, 1952, p.396-397, pl.A, fig.5-6; text-fig.8) Sarjeant, 1984c, p.129, pl.1, fig.4. Paleocene. Originally *Areoligera*, subsequently *Baltisphaeridium*, then *Hystrichosphaeridium*, then *Cleistosphaeridium*. At the time of the transfer, Sarjeant, 1984c, p.129-130 emended the diagnosis. Lejeune-Carpentier and Sarjeant, 1981 considered this species to be a *jr syn.* of *Areoligera senonensis*.

ACHOMOSPHAERA (cont'd)

?delicata Sah *et al.*, 1970, p.144-145, pl.1, fig.4-5. Late Cretaceous. Stover and Evitt, 1978, p.139 considered this to be a "provisionally accepted species".

?globata Sah *et al.*, 1970, p.145, pl.1, fig.10-11. Late Cretaceous. Stover and Evitt, 1978, p.139 considered this to be a "provisionally accepted species".

grallaeformis (Brosius, 1963, p.42, pl.5, fig.3; text-fig.2) Davey and Williams, 1969, p.4. Oligocene; formerly *Hystrichosphaeridium*.

heterostylis (Heisecke, 1970, p.238, pl.5, fig.1-4; pl.6, fig.4-5) Stover and Evitt, 1978, p.138. Danian. Originally *Hystrichosphaera;* subsequently *Spiniferites*.

"hirundo" (Eisenack, 1958) Davey and Williams, 1969, p.4. NOW *?Cordosphaeridium;* formerly *Hystrichosphaeridium*.

"hyperacantha" (Deflandre and Cookson, 1955) Davey and Williams, 1969, p.4. NOW *Spiniferites;* formerly *Hystrichosphaera*.

improcera Islam, 1983c, p.80-81, pl.1, fig.1-2. Middle Eocene.

linifera (Cookson and Eisenack, 1967b, p.253, pl.40, fig.9; pl.41, fig.7-8) Stover and Evitt, 1978, p.138-139. Late Paleocene. Originally *Baltisphaeridium;* subsequently *Taeniophora*.

mariannae (Philippot, 1949, p.56-57, fig.2) Stover and Evitt, 1978, p.139. Late Cretaceous. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium*.

"membraniphora" (Agelopoulos, 1964) Eaton, 1976, p.237. NOW and formerly *Hystrichostrogylon*.

microreticulata Salujha and Kindra, 1981, p.51, pl.2, fig.47. Early Paleocene. Jain and Garg, 1982, p.69 stated that this species is based on two incomplete specimens and the name should be restricted to the holotype.

"microtriaina" (Klumpp, 1953) Sarjeant, 1981, p.110-112. NOW *Operculodinium*. Originally *Hystrichosphaeridium*. At the time of the transfer, Sarjeant, *op.cit.* emended the diagnosis. This emendation is herein rejected.

multifurcata Jain and Tandon, 1981, p.7, pl.1, fig.10. Middle Eocene.

***ACHOMOSPHAERA* (cont'd)**

?neptunii (Eisenack, 1958, p.399, pl.26, fig.7-8; text-fig.8) Davey and Williams, 1966a, p.51-52, pl.3, fig.7; pl.9, fig.11. Early Cretaceous; formerly *Baltisphaeridium*. Stover and Evitt, 1978, p.139 considered this to be a "provisionally accepted species", stating that the holotype has an apical archeopyle and intratabular processes. For these reasons we do not accept the emendation and transfer to *Spiniferites* by Duxbury, 1983, p.55.

"*?operculata*" (Sah *et al.*, 1970). NOW *Operculodinium*. Stover and Evitt, 1978, p.139 considered this to be a "provisionally accepted species" of *Achomosphaera*.

**ramulifera* (Deflandre, 1937b, p.74, pl.14, fig.5-6; pl.17, fig.10) Evitt, 1963, p.163. Late Cretaceous. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium*. The transfer of this species to *Spiniferites* by Reid, 1974, p.608-609 was rejected by Lentin and Williams, 1977b, p.2, and the same transfer by May, 1980, p.63 was rejected by Lentin and Williams, 1981, p.3, since according to Davey and Williams, 1966a, p.46, parasutural lines have not been observed on the holotype, although one of the paratypes possesses very faint lines. Also the generic diagnosis for *Spiniferites* would have to be emended to accommodate taxa lacking visible expression of parasutures. See also *Homotryblium distinctum* and *Hystrichosphaeridium rehdense* which are *jr synonyms* of this species.

subsp. *gabonensis* (Boltenhagen, 1977, p.36-37, pl.3, fig.7-9) Lentin and Williams, 1981, p.3. Campanian-Maastrichtian; formerly *Achomosphaera ramulifera* var. *gabonensis*.

subsp. *perforata* (Davey and Williams, 1966a, p.50, pl.5, fig.1,4) Lentin and Williams, 1973, p.10. Early Eocene; formerly *Achomosphaera ramulifera* var. *perforata*.

subsp. *ramosasimilis* Yun, 1981, p.14-15, pl.1, fig.1,8; text-fig.3b. Early Santonian.

recurvata Jain *et al.*, 1975, p.8, pl.3, fig.36-37,39. Maastrichtian.

reginensis Corradini, 1973, p.171, pl.27, fig.2; text-fig.8. Senonian.

?robusta Sah *et al.*, 1970, p.145, pl.1, fig.6-7. Late Cretaceous. Stover and Evitt, 1978, p.139 considered this to be a "provisionally accepted species".

sagena Davey and Williams, 1966a, p.51, pl.2, fig.1-2. Cenomanian. May, 1980, p.64 suggested that this species is conspecific with *Spiniferites crassipellis*. Lentin and Williams, 1981, p.4 rejected this suggestion.

"*septata*" (Cookson and Eisenack, 1967b) Stover and Evitt, 1978, p.139. NOW *Hafniasphaera*. The transfer of this species to *Achomosphaera* by Stover and Evitt, *op.cit.* was rejected by Lentin and Williams, 1981, p.4 who retained the species in *Hafniasphaera*.

ACHOMOSPHAERA **(cont'd)**

transculenta (Sah *et al.*, 1970, p.147, pl.2, fig.18-19) Jain, 1982, p.52. Late Cretaceous; formerly *Hystrichosphaeridium*. When Jain, *op.cit.* transferred this species, he stated that the specimen illustrated by Sah *et al.* (pl.2, fig.19) is *Cordosphaeridium inodes*.

triangulata (Gerlach, 1961, p.194-195, pl.29, fig.1) Davey and Williams, 1969, p.4; emend. Sarjeant, 1984b, p.82-83, pl.1, fig.4-5 (holotype). Miocene; formerly *Baltisphaeridium*.

"tridactylites" (Valensi, 1955a) Deflandre and Sarjeant, 1970, p.1. NOW *Florentinia*. Originally *Hystrichosphaeridium*.

"valianta" (Sah *et al.*, 1970). NOW *Cordosphaeridium*.

verdieri Below, 1982c, p.3, pl.8, fig.10-11; text-fig.1a-d. Hauterivian-Albian.

ACTINISCUS (Ehrenberg, 1840, as a subgenus of *Dictyocha)* Ehrenberg, 1843, p.103 raised to generic rank.

?discus Ehrenberg, 1854, pl.21, fig.49. Pliocene. (No description given.)

elegans (Ehrenberg, 1840) Ehrenberg, 1854, pl.22, fig.31. Pliocene; formerly *Dictyocha*.

heptagonus (Ehrenberg, 1840) Ehrenberg, 1854, pl.20, fig.49. Pliocene; formerly *Dictyocha*.

**pentasterias* (Ehrenberg, 1840) Ehrenberg, 1854, pl.18, fig.61; pl.19, fig.45; pl.33 (XVII), fig.1 = *Dictyocha (Actiniscus) pentasterias*, Ehrenberg, 1840, p.111,149; fixed as type of the genus by Downie and Sarjeant, 1965, p.82. Pliocene.

?rota Ehrenberg, 1854, pl.21, fig.50. Pliocene. (No description given.)

sexfurcatus Ehrenberg, 1854, pl.35, fig.15. Recent. (No description given.)

sirius Ehrenberg, 1854, pl.33, fig.1. Miocene. (No description given.)

?stella (Ehrenberg, 1840) Ehrenberg, 1854, pl.22, fig.52. Pliocene; formerly *Dictyocha*.

talmadgei Parke, 1974, p.81-82, pl.1, fig.1-9. Late Miocene.

tetrasterias Ehrenberg, 1854, pl.28, fig.62. Miocene. (No description given.)

ACTINOTHECA Cookson and Eisenack, 1960a, p.9.

**aphroditae* Cookson and Eisenack, 1960a, p.9, pl.2, fig.19-20. Turonian.

***ACTINOTHECA* (cont'd)**

ornata Cookson and Eisenack, 1970a, p.147, pl.13, fig.1-2. Senonian.

?rara Corradini, 1973, p.183, pl.30, fig.1. Late Cretaceous-?Paleocene. Stover and Evitt, 1978, p.200 considered this to be a "provisionally accepted species".

ADNATOSPHAERIDIUM Williams and Downie, 1966c, p.215.

"aemulum" (Deflandre, 1938b) Williams and Downie, 1969, p.17. NOW *Rigaudella*. Originally *Hystrichosphaeridium;* subsequently *Cannosphaeropsis*.

subsp. *"integrum"* (Cookson and Eisenack, 1958) Eisenack and Kjellström, 1971a, p.45. NOW *Rigaudella aemula subsp. integra;* formerly *Cannosphaeropsis aemula* subsp. *integra*.

"apenninicum" (Corradini, 1973). NOW *Rigaudella*.

"apiculatum" (Cookson and Eisenack, 1960b) Lentin and Williams, 1973, p.11. NOW *Rigaudella;* formerly *Cannosphaeropsis*.

"?capilatum" De Coninck, 1969, p.39, pl.11, fig.9-14,21-24. Early Eocene. De Coninck, *op.cit.* questionably included this species in *Adnatosphaeridium*. Eaton, 1976, p.306 considered this species (although excluding De Coninck, pl.11, fig.14) to be a *jr syn.* of *Impletosphaeridium implicatum* Morgenroth.

caulleryi (Deflandre, 1938b, p.189, pl.11, fig.2-3) Williams and Downie, 1969, p.17. Oxfordian. Originally *Hystrichosphaeridium;* subsequently *Cannosphaeropsis*.

?chonetum (Cookson & Eisenack, 1962b, p.493, pl.4, fig.8-10) Davey, 1969a, p.171. Late Albian-Cenomanian; formerly *Cannosphaeropsis*. Stover and Evitt, 1978, p.15 considered this to be a "provisionally accepted species".

"delicatum" (Horowitz, 1975) Stover and Evitt, 1978, p.15. Stover and Evitt, *op.cit.* included *Areoligera delicata* in *Adnatosphaeridium* without effecting a transfer. These authors considered it to be a "problematical species". See *Areoligera delicata*.

"filamentosum" (Cookson & Eisenack, 1958) Williams and Downie, 1969, p.17. NOW *Rigaudella;* formerly *Cannosphaeropsis*.

filiferum (Cookson & Eisenack, 1958, p.46, pl.7, fig.4) Williams and Downie, 1969, p.17. Turonian-Early Maastrichtian; formerly *Cannosphaeropsis*.

huenickenii Archangelsky, 1969b, p.201,203, pl.5, fig.5-7. Eocene. Stover and Evitt, 1978, p.15 considered this to be a "problematical species". O.C.

ADNATOSPHAERIDIUM (cont'd)

multispinosum Williams and Downie, 1966c, p.216, pl.24, fig.5; text-fig.57. Early Eocene.

"?patulum" (Williams and Downie, 1966c). NOW *Thalassiphora*. Williams and Downie, 1966c, p.217 questionably included this species in *Adnatosphaeridium*.

"paucispinum" (Klement, 1960, p.72, pl.10, fig.9-10) Gitmez and Sarjeant, 1972, p.234. Late Oxfordian; formerly *Cannosphaeropsis*. Sarjeant, 1984a, p.172 believed that this species is a *jr syn*. of *Rigaudella aemula* (Deflandre) Below.

"perforatum" (Alberti, 1961) Riley and Sarjeant, 1972, p.3. NOW *Rigaudella;* formerly *Cannosphaeropsis*.

reticulense (Pastiels, 1948, p.49, pl.5, fig.7-10) De Coninck, 1969, p.40. Early Eocene; formerly *Cannosphaeropsis*.

robustum (Morgenroth, 1966a, p.19, pl.4, fig.1) DeConinck, 1975, p.47-48. Early Eocene; formerly *Cannosphaeropsis*. The transfer of this species from *Cannosphaeropsis* to *Adnatosphaeridium* is not attributable to Eaton, 1976, p.239.

tutulosum (Cookson and Eisenack, 1960a, p.8, pl.2, fig.12-13) Morgan, 1980, p.14. Cenomanian; formerly *Cannosphaeropsis*. Stover and Evitt, 1978, p.144 considered this to be a "problematical species" of *Cannosphaeropsis*.

"uncinatum" (Norvick, 1976). NOW *Cyclonephelium*.

"vetusculum" (Davey, 1974). NOW *Nexosispinum*.

**vittatum* Williams and Downie, 1966c, p.215, pl.24, fig.3,7; text-fig.56. Early Eocene.

williamsii Islam, 1983c, p.81-82, pl.4, fig.9-10. Early Eocene.

?willieieae De Coninck, 1975, p.49, pl.2, fig.9-11. Early Eocene (Ypresian) O.C. De Coninck, *op.cit.* questionably included this species in *Adnatosphaeridium*. Stover and Evitt, 1978, p.15 considered this to be a "problematical species".

"AGERASPHAERA" Harland, 1979a, p.28-29. *Jr syn*. of *Alisocysta* Stover and Evitt according to Harland, 1979a, p.35. The type of the genus, *Agerasphaera margarita*, was transferred to *Alisocysta* by Harland, 1979a, p.35. Harland, *op.cit.*, p.29 also included in *Agerasphaera*, *"Eisenackia circumtabulata"* Drugg 1967. This species is the nomenclatural type of *Alisocysta*.

AIORA Cookson and Eisenack, 1960a, p.9. Wilson and Clowes, 1980, p.10 accepted the treatment of Stover and Evitt, 1978, p.225 in retaining *Aiora* as a monospecific genus with *A. fenestrata* as the type species. Stover and Evitt, *op.cit.* indicated that they had emended the diagnosis of this genus; no emendation, however, is apparent. Wilson and Clowes, 1980, p.10 therefore, by implication, rejected the emendation of the genus *Aiora* and the retention of *A. fenestrata* in *Cannosphaeropsis* by Davey, 1978, p.893.

*_fenestrata_ (Deflandre and Cookson, 1955, p.283, pl.3, fig.2; text-fig.43) Cookson and Eisenack, 1960a, p.9. Turonian-Santonian; formerly *Cannosphaeropsis*. The retention of *Aiora fenestrata* in *Cannosphaeropsis* by Davey, 1978, p.893 was rejected by Lentin and Williams, 1981, p.7.

"perforata" (Davey, 1978). NOW *Balteocysta*. According to Lentin and Williams, 1981, p.7, Davey, 1978, p.892 erected the species *Aiora perforata* (as *"A. perforare")* and designated it as the type of the genus. The holotype of *A. perforata* is *Aiora fenestrata* Deflandre and Cookson, 1955, *sensu* Cookson and Eisenack, 1960a, pl.2, fig.17. Subsequently, Stover and Evitt, 1978, p.226 designated the same specimen as the holotype of the species *Balteocysta rotula;* this was the type and single species of the genus. *Balteocysta perforata* is therefore the *sr syn.* of *Balteocysta rotula* and is the correct name for the nomenclatural type of that genus. Lentin and Williams, 1981, p.7 assumed that Davey named this species for the perforations it possesses: since it was "perforate", he used the Latin *perforare,* which is equivalent to the English infinitive "perforate"; the Latin for the past parti- ciple is *perforatus*. Therefore, the correct orthography of the specific epithet is *perforata* and not *perforare* (I.C.B.N. Art. 73:1; 23:5), since Davey indicated in his text that the name was not composed arbitrarily.

AIREIANA Cookson and Eisenack, 1965a, p.127.

salicta Damassa, 1979a, p.817-818, pl.1, fig.4-9; text-fig.2. Early-Middle Eocene.

*_verrucosa_ Cookson and Eisenack, 1965a, p.127, pl.14, fig.11-13; emend. Stover, 1975, p.43-44. Late Eocene.

ALASKADINIUM Duxbury, 1977, p.37. Duxbury, *op.cit.* stated that *Alaskadinium* was a *nom. subst. pro Nelchinopsis* Wiggins, 1972, p.299. Duxbury's reasoning was based upon his retention of the species *kostromiensis* in the genus *Gonyaulacysta,* thus making *Nelchinopsis* a *jr syn.* of the former genus. The genus *Alaskadinium* was erected to include forms described as *Nelchinopsis kostromiensis* in Wiggins, 1972, p.301-302, and figured in pl.1, fig.A-F and text-fig.2. These specimens were all included in the type of the genus, *Alaskadinium wigginsii*. Duxbury, 1977 illustrated specimens very similar to *Gonyaulacysta kostromiensis* (Vozzhennikova) Sarjeant, and assigned them to that species, with the remark that his material showed a normal *Gonyaulacysta* tabulation pattern "as described by

ALASKADINIUM (cont'd)

Vozzhennikova". Vozzhennikova, 1967, stated that she did not observe an archeopyle; her illustrations of the holotype, however, appear to lack the apical horn. Wiggins, 1972, p.301-302, gave a detailed analysis of the tabulation of his material, which he also identified as *G. kostromiensis*. He assumed that the low ridges on the apical horn (also noted by Duxbury) reflect tabulation, and that detachment of the apical horn and possibly also the apical sulcal plate produced the archeopyle. The illustrated material of all three authors appears similar if not identical. Duxbury did not provide documentation for his interpretation that Wiggins's material is a different species to *G. kostromiensis;* however, on the basis of Wiggins's interpretation, he gave a new genus and species name to the Alaskan material: *Alaskadinium wigginsii* (Wiggins, 1972, p.301-302, pl.1, fig.A- F). The genus *Alaskadinium* was retained by Lentin and Williams, 1981, p.8, pending re-examination of Wiggins's material.

**wigginsii* Duxbury, 1977, p.37 and illustrated in Wiggins, 1972, p.301-302, pl.1, fig.A-F, as *Nelchinopsis kostromiensis* (Vozzhennikova, 1967) Wiggins, text-fig.2 *non Gonyaulax kostromiensis* Vozzhennikova, 1967, p.85-86, pl.26, fig.1-6; pl.27, fig.1-2. Neocomian, probably Valanginian or Early Hauterivian.

"ALBERTIA" Vozzhennikova, 1967, p.150-151. *Jr hom.* of *Albertia* Schimper, 1837. The species *"Albertia curvicornis"* and *"Albertia recticornis"* are now included in *Alterbidinium.*

ALDORFIA Stover and Evitt, 1978, p.140.

**aldorfensis* (Gocht, 1970b, p.136-138, pl.30, fig.1-3; pl.31, fig.9-11; pl.32, fig.1-3; text-fig.5,9) Stover and Evitt, 1978, p.140. Early Bathonian; formerly *Gonyaulacysta.*

corticata Norris and Jux, 1984, p.162-163, pl.2, fig.5-16; pl.3, fig.6-7; pl.6, fig.1-5. Late Kimmeridgian-Portlandian.

deflandrei (Clarke and Verdier, 1967, p.26-28, pl.3, fig.10-12 text-fig.10) Stover and Evitt, 1978, p.140. Cenomanian-Santonian; formerly *Gardodinium.*

dictyophora (Deflandre, 1938b, p.178, pl.8, fig.1-3) Stover and Evitt, 1978, p.140. Oxfordian. Originally *Palaeoperidinium;* subsequently *Gonyaulacysta.*

"dictyota" (Cookson and Eisenack, 1960b) Davey, 1982b, p.25. NOW *Scriniocassis.*

spongiosa (McIntyre and Brideaux, 1980, p.12, pl.2, fig.8-12) Davey, 1982b, p.25. Valanginian; formerly *Apteodinium.*

vectensis Duxbury, 1983, p.39, pl.4, fig.3,7,10. Late Aptian.

ALISOCYSTA Stover and Evitt, 1978, p.15-16. See also *Ageraephaera* which is a *jr syn.* of this genus.

**circumtabulata* (Drugg, 1967, p.15, pl.1, fig.12-13) Stover and Evitt, 1978, p.16. Danian; formerly *Eisenackia.* See also "*Hystrichokolpoma circumtabulata.*

margarita (Harland, 1979a, p.29,31,33, pl.1, fig.1-12; pl.2, fig.1-10) Harland, 1979a, p.35. Paleocene; formerly *Ageraephaera.*

ornata (Cookson and Eisenack, 1965a, p.124, pl.13, fig.1-8) Stover and Evitt, 1978, p.16. Late Eocene; formerly *Eisenackia.*

reticulata Damassa, 1979b, p.196,198,200, pl.3, fig.1-6; pl.4, fig.4-5; text-fig.3. Early Paleocene.

rugolirata Damassa, 1979b, p.193-194,196, pl.3, fig.7-13,21,23,27; text-fig.2. Early Paleocene.

"*ALTERBIA*" Lentin and Williams, 1976, p.47 *nom. subst. pro Albertia* Vozzhennikova, 1967, p.151 (*non Albertia* Schimper, 1837). The emendation of *Alterbia* by Lentin and Williams, 1976 was illegitimate, because they included the type species of two genera validly published before 1976: *Andalusiella mauthei* Riegel, 1974 and *Senegalinium bicavatum* Jain and Millepied, 1973. However, Lentin and Williams, 1977b, p.5 indicated that the three genera *Alterbia, Andalusiella* and *Senegalinium* are distinct and separate entities, each to be maintained in its own right. This is not correct, since *Alterbia* was nomenclaturally illegitimate when it was erected. When Lentin and Williams, 1977b, p.5 reasoned that the three genera, *Alterbia, Andalusiella* and *Senegalinium* were separate genera, they created the *jr homonym Alterbia* Lentin and Williams, 1977b *(non Alterbia* Lentin and Williams, 1976). I.C.B.N., Art.64 specifies that a *jr homonym* must be rejected, even if the earlier name (to which it is similar) was illegitimate. Accordingly, we herein erect the genus *Alterbidinium* to include all taxa included in *Alterbia.*

"acribes" (Davey and Verdier, 1971) Lentin and Williams, 1976, p.48. NOW *Angustidinium;* formerly *Deflandrea.* Stover and Evitt, 1978, p.93 considered this to be a "problematical species" of *Alterbia.*

"acuminata" (Cookson and Eisenack, 1958) Lentin and Williams, 1976, p.48. NOW *Isabelidinium;* formerly *Deflandrea.* The transfer of this species to *Senegalinium* by Loeblich and Tappan, 1977, p.365 was rejected by Lentin and Williams, 1981, p.9.

*"*acutula"* (Wilson, 1967b) Lentin and Williams, 1976, p.48. NOW *Alterbidinium;* formerly *Deflandrea.* The original type of the genus *Alterbia, A. recticornis,* is considered to be a *jr syn.* of *A. acutula* by Whitney, 1979, p.125; the latter species therefore became the type of the genus.

"*ALTERBIA*" (cont'd)

"*amphiata*" (McIntyre, 1975) Yun, 1981, p.64. The transfer of this species to *Alterbia* by Yun, 1981 is herein rejected and the species is retained in *?Isabelidinium*.

"*asymmetrica*" (Wilson, 1967a) Lentin and Williams, 1976, p.48. NOW *?Senegalinium;* formerly *Deflandrea*.

"*bakeri*" (Deflandre and Cookson, 1955) Yun, 1981, p.65. The transfer of this species to *Alterbia* by Yun, 1981, p.65 is herein rejected and the species is retained in *Isabelidinium*.

"*balmei*" (Cookson and Eisenack, 1962b) Lentin and Williams, 1976, p.48; emend. Morgan, 1977, p.130. NOW *Isabelidinium;* formerly *Deflandrea*.

"*bicavata*" (Jain and Millepied, 1973) Lentin and Williams, 1976, p.49. NOW and formerly *Senegalinium*.

"*?bicellula*" (Islam, 1983b). NOW *Alterbidinium*. Islam, *op.cit.* questionably included this species in *Alterbia*.

"*curvicornis*" (Vozzhennikova, 1967, p.151, pl.74, fig.1-3) *ex* Lentin and Williams, 1976, p.49. Campanian; formerly *Albertia*. Although Lentin and Williams, *op.cit.* did not state that a new combination was being created, Stover and Evitt, 1978, p.93 accepted the new combination as validly published in 1976 instead of in Lentin and Williams, 1977b, p.6. Whitney, 1979, p.125 considered *A. curvicornis* to be a *jr syn.* of *Alterbia acutula* (Wilson) Lentin and Williams.

"*daveyi*" (Stover and Evitt, 1978). NOW *Alterbidinium*.

"*dilwynensis*" (Cookson and Eisenack, 1965c), Lentin and Williams, 1976, p.49. NOW *?Senegalinium;* formerly *Deflandrea*.

"*?distincta*" (Wilson, 1967a) Lentin and Williams, 1976, p.49. NOW *Alterbidinium;* formerly *Deflandrea*. Stover and Evitt, 1978, p.93 considered this to be a "provisionally accepted species" of *Alterbia*.

"*?earnleyensis*" (Islam, 1983b). NOW *Alterbidinium*. Islam, *op.cit.* questionably included this species in *Alterbia*.

"*ectorugosa*" (Archangelsky, 1969b) Lentin and Williams, 1976, p.49. NOW *Senegalinium;* formerly *Deflandrea*.

"*?eyrensis*" (Cookson and Eisenack, 1971) Lentin and Williams, 1976, p.49. NOW *Eurydinium;* formerly *Deflandrea*. At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Alterbia*.

***"ALTERBIA"* (cont'd)**

"foliacea" (Eisenack and Cookson, 1960) Lentin and Williams, 1976, p.49. NOW *Subtilisphaera;* formerly *Deflandrea.*

"ingramii" (Cookson and Eisenack, 1970a) Lentin and Williams, 1976, p.49. NOW *Eurydinium;* formerly *Deflandrea.*

"macrocysta" (Cookson and Eisenack, 1960a) Lentin and Williams, 1976, p.49. NOW *Senegalinium;* formerly *Deflandrea.*

"mauthei" (Riegel, 1974) Lentin and Williams, 1976, p.149. The transfer of this species (as a *jr syn.* of *Andalusiella polymorpha)* to *Alterbia* by Lentin and Williams, 1976, p.149 was rejected by Lentin and Williams, 1977b, p.8 and the species was retained in *Andalusiella.*

"micrograndata" (Stanley, 1965) Lentin and Williams, 1976, p.49. NOW *Senegalinium;* formerly *Deflandrea.*

"minor" (Alberti, 1959b) Lentin and Williams, 1976, p.49. NOW *Alterbidinium;* formerly *Deflandrea.*

"montanaensis" (Harland, 1977a) Lentin and Williams, 1981, p.10. NOW *Alterbidinium.* Originally *Deflandrea;* subsequently *Spinidinium.*

"obscura" (Drugg, 1967) Lentin and Williams, 1976, p.49. NOW *Senegalinium;* formerly *Deflandrea.*

"pellucida" (Deflandre and Cookson, 1955) Yun, 1981, p.64. The transfer of this species to *Alterbia* by Yun, 1981 is herein rejected and the species is retained in *Isabelidinium.*

"?pentaradiata" (Cookson and Eisenack, 1965c) Lentin and Williams, 1976, p.49. NOW *Alterbidinium;* formerly *Deflandrea.* Lentin and Williams, 1976, p.49 discussed their reasons for questionably including this species in *Alterbia.*

subsp. *"preceda"* (Cookson and Eisenack, 1974) Lentin and Williams, 1976, p.50. NOW *Alterbidinium;* formerly *Deflandrea pentaradiata* subsp. *preceda.*

"pilosa" (Davey, 1969b) Lentin and Williams, 1976, p.50. NOW *Alterbidinium;* formerly *Deflandrea.*

"polymorpha" (Malloy, 1972) Lentin and Williams, 1976, p.50. NOW *Andalusiella;* formerly *Svalbardella.*

"raijae" (Kjellström, 1973) Lentin and Williams, 1976, p.50. NOW *Manumiella;* formerly *Deflandrea.* See also *Eurydinium.*

***"ALTERBIA"* (cont'd)**

"recticornis" (Vozzhennikova, 1967, p.151-152, pl.77, fig.1-4; pl.78, fig.1- 3; pl.79, fig.1-2) Lentin and Williams, 1976, p.47. Turonian; formerly *Albertia.* Lentin and Williams, 1981, p.11 rejected Stover and Evitt's (1978, p.93) contention that Vozzhennikova had not validly published this species: she *(op.cit.,* p.151) did designate a holotype, which apparently is illustrated in two different aspects. The designation by Stover and Evitt of a lectotype (Vozzhennikova, 1967, pl.77, fig.1) is superfluous. *Alterbia recticornis,* the original nomenclatural type of the genus *Alterbia,* is considered by Whitney, 1979, p.125, to be a *jr syn.* of *Alterbia acutula* (Wilson) Lentin and Williams. Consequently, Lentin and Williams, 1981, p.11 accepted *Alterbia acutula* as the correct name for the type species of this genus.

"rhombohedra" (Benson, 1976) Lentin and Williams, 1977b, p.7. NOW *Andalusiella;* formerly *Deflandrea.*

***ALTERBIDINIUM** nom. nov., nom. subst. pro Alterbia* Lentin and Williams, 1977, p.5 *non Alterbia* Lentin and Williams, 1976, p.47.

**acutulum* (Wilson, 1967b) *comb. nov.*
1967b *Deflandrea acutula* Wilson, p.225-226, fig.11-12. ?Paleocene; also formerly *Alterbia.*

?bicellulum (Islam, 1983b) *comb. nov.*
1983b *?Alterbia bicellula* Islam, p.335-336, pl.1, fig.6-7. Middle Eocene. We herein questionably include this species in *Alterbidinium.*

daveyi (Stover and Evitt, 1978) *comb. nov.*
1978 *Alterbia daveyi* Stover and Evitt, p.93 = *Deflandrea pirnaensis* Alberti, 1959b of Davey, 1970, p.338-339, pl.1, fig.3-4 *non D. pirnaensis* of Alberti, 1959b, p.100, pl.8, fig.1-5. Albian-Cenomanian.

?distinctum (Wilson, 1967a) *comb. nov.*
1967a *Deflandrea distincta* Wilson, p.63-64, fig.9-10. Erratic, Early Tertiary; also formerly *?Alterbia.* We herein questionably include this species in *Alterbidinium.*

?earnleyense (Islam, 1983b) *comb. nov.*
1983b *?Alterbia earnleyensis* Islam, p.336, pl.1, fig.10-11. Middle Eocene. We herein questionably include this species in *Alterbidinium.*

minor (Alberti, 1959b) *comb. nov.*
1959b *Deflandrea minor* Alberti, p.98, pl.9, fig.9-11. Late Senonian; also formerly *Alterbia.*

montanaense (Harland, 1977a) *comb. nov.*
1977a *Deflandrea montanaensis* Harland, p.184-185, pl.25, fig.4,6-7,10-12. Late Campanian-Maastrichtian. Also formerly *Spinidinium,* then *Alterbia.*

***ALTERBIDINIUM* (cont'd)**

?pentaradiatum (Cookson and Eisenack, 1965c) *comb. nov.*
1965c *Deflandrea pentaradiata* Cookson and Eisenack, p.139-140, pl.18, fig. 1-2. Paleocene. Also formerly *?Alterbia*. We herein questionably include this species in *Alterbidinium*.

subsp. *precedum* (Cookson and Eisenack, 1974) *comb. nov.*
1974 *Deflandrea pentaradiata* subsp. *preceda* Cookson and Eisenack, p.49, pl.20, fig.1-2. Paleocene. See also *?Alterbia pentaradiata* subsp. *preceda*.

pilosum (Davey, 1969b) *comb. nov.*
1969b *Deflandrea pilosa* Davey, p.9, pl.3, fig.2-5. Campanian-Maastrichtian; also formerly *Alterbia*.

AMBONOSPHAERA Fensome, 1979, p.50-51.

**calloviana* Fensome, 1979, p.51-54, pl.7, fig.3,5-6,8-9; text-fig.16-17. Callovian.

"jurassica" (Gitmez and Sarjeant, 1972) Fensome, 1979, p.51. NOW and formerly *Senoniasphaera*. The transfer of this species to *Ambonosphaera* was rejected by Lentin and Williams, 1981, p.11.

AMICULOSPHAERA Harland, 1979b, p.535.

**umbracula* Harland, 1979b, p.535, pl.1, fig.11-14,22-23; pl.2, fig.1-3. Middle Miocene-Pleistocene.

AMPHIDIADEMA Cookson and Eisenack, 1960a, p.4; emend. Lentin and Williams, 1976, p.60-61.

**denticulata* Cookson and Eisenack, 1960a, p.4, pl.1, fig.11. Senonian.

nucula (Cookson and Eisenack, 1962b, p.486, pl.1, fig.13) Lentin and Williams, 1976, p.61. Senonian; formerly *Deflandrea*.

rectangularis (Cookson and Eisenack, 1962b, p.486, pl.1, fig.14-15) Lentin and Williams, 1976, p.61. Late Turonian-Middle Senonian; formerly *Deflandrea*. Stover and Evitt, 1978, p.94 erroneously considered this species to be a *jr syn.* of *Hystrichosphaeropsis quasicribrata* according to Gocht, 1976, p.322. However, only the specimen identified by Kjellström, 1973, fig.17 was considered synonymous.

subsp. *"samuelsonii"* (Kjellström, 1973, p.22, fig.18) Lentin and Williams, 1976, p.61. Maastrichtian. Originally *Deflandrea rectangularis* var. *samuelsonii*; subsequently *Deflandrea rectangularis* subsp. *samuelsonii*. Gocht, 1976, p.322 considered this taxon to be a *jr syn.* of *Hystrichosphaeropsis quasicribrata* (O. Wetzel) Gocht.

AMPHIDINIUM Claparede and Lachmann, 1859, p.276. Modern genus defined from the motile stage. Fossil cysts formerly included within this genus are listed below together with the present generic assignment.

"mitratum" (Vozzhennikova, 1967). NOW *Dinogymnium*.

"sibiricum" (Vozzhennikova, 1965) *nom. nud.* (no type figured).

AMPHOROSPHAERIDIUM Davey, 1969c, p.30.

"bipolare" (Cookson and Eisenack, 1965b) Davey, 1969c, p.35. NOW *Fibrocysta*.

**fenestratum* Davey, 1969c, p.30-32, pl.1, fig.6; pl.2, fig.2,4; pl.3, fig.1-3. Campanian-Maastrichtian.

subsp. *dividum* (Davey, 1969c, p.32-33, pl.2, fig.5-6; text-fig.2) Lentin and Williams, 1973, p.13. Campanian-Maastrichtian; formerly *Amphorosphaeridium fenestratum* var. *dividum*.

latitubulum Davey, 1969c, p.33-34, pl.4, fig.2,7; text-fig.1, no.4. Campanian-Maastrichtian.

majus (Lejeune-Carpentier, 1940, p.220; text-fig.13) emend. Lejeune-Carpentier and Sarjeant, 1981, p.12. Senonian. Originally *Hystrichosphaeridium;* subsequently *?Polysphaeridium,* then *Cordosphaeridium*. See also *?Dapsilidinium*. O.C.

multibrevum Davey, 1969c, p.34-35, pl.3, fig.5-6; pl.4, fig.1; text-fig.1, no.3. Campanian-Maastrichtian.

?multispinosum (Davey and Williams, 1966b, p.89-90, pl.3, fig.6) Sarjeant, 1981, p.123. Early Eocene; formerly *Cordosphaeridium*.

?robustum (Salujha and Kindra, 1981, p.52, pl.3, fig.55-56) Jain and Garg, 1982, p.69. Early Paleocene; formerly *Hystrichokolpoma*. Jain and Garg, 1982, p.69 indicated that the specimen in pl.3, fig.56 of Salujha and Kindra, 1981 is a species of *Achomosphaera*. At the time of the transfer, Jain and Garg, *op.cit.* questionably included the holotype of this species in *Amphorosphaeridium*.

AMPHORULA Dodekova, 1969, p.19.

**metaelliptica* Dodekova, 1969, p.20, pl.4, fig.1-3. Tithonian.

ANDALUSIELLA Riegel, 1974, p.357; emend. Riegel and Sarjeant, 1982, p.287. Lentin and Williams, 1976, p.149 and Loeblich and Tappan, 1977, p.368 erroneously concluded that *Andalusiella* and *Alterbia* were synonymous.

ANDALUSIELLA **(cont'd)**

?dubia (Jain and Millepied, 1973, p.25, pl.2, fig.12-13) Lentin and Williams, 1980, p.41. Maastrichtian. Originally *Senegalinium;* subsequently *?Deflandrea.* At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Andalusiella.*

inflata (Rauscher and Doubinger, 1982) *comb. nov.*
1982 *Svalbardella inflata* Rauscher and Doubinger, p.104-105, pl.1, fig. 13-17. Maastrichtian.

"laevigata" (Malloy, 1972) Lentin and Williams, 1977b, p.8. Senonian. NOW *Senegalinium.* Originally *Deflandrea;* subsequently *Lejeunia.* See also *Lejeunecysta.*

**mauthei* Riegel, 1974, p.357-360, pl.2, fig.1-7; text-fig.5-6; emend. Riegel and Sarjeant, 1982, p.189. ?Senonian. The transfer of this species (as a *jr syn.* of *Andalusiella polymorpha)* to *Alterbia* by Lentin and Williams, 1976, p.149 was rejected by Lentin and Williams, 1977b, p.8, because of the distinctive nature of the antapical region.

polymorpha (Malloy, 1972, p.63-64, pl.1, fig.8-16,21) Lentin and Williams, 1977b, p.8. Maastrichtian. Originally *Svalbardella;* subsequently *Alterbia.* See also *Palaeocystodinium microgranulatum* and *Palaeocystodinium punctatum* which are *jr synonyms* of this species.

rhombohedra (Benson, 1976, p.195, pl.9, fig.10-12) Stover and Evitt, 1978, p.95. Early Paleocene. Originally *Deflandrea;* subsequently *Alterbia.*

rhomboides (Boltenhagen, 1977, p.106-107, pl.20, fig.1-3) Lentin and Williams, 1980, p.41. Campanian; formerly *Svalbardella.*

spicata (May, 1980, p.79, pl.9, fig.18-20) Lentin and Williams, 1981, p.13. Campanian-Maastrichtian; formerly *Deflandrea.*

vozzhennikovae (Boltenhagen, 1977, p.108, pl.19, fig.5-7) Lentin and Williams, 1980, p.41. Campanian; formerly *Svalbardella.*

ANGUSTIDINIUM Goodman and Evitt, 1981, p.47-48.

**acribes* (Davey and Verdier, 1971, p.38-39, pl.2, fig.10,12) Goodman and Evitt, 1981, p.48. Early Albian. Originally *Deflandrea;* subsequently *Alterbia.* At the time of the transfer, Goodman and Evitt, *op.cit.*, p.48,50,52 emended the diagnosis.

"ANHYSTRICHOSPHAERIDIUM" Deflandre in West, 1961, p.452 *nom. nud.* No diagnosis was given.

ANTHOSPHAERIDIUM Cookson and Eisenack, 1968, p.115.

**convolvuloides* Cookson and Eisenack, 1968, p.115, fig.4A-D. Santonian-Early Campanian.

APECTODINIUM (Costa and Downie, 1976, p.608) Lentin and Williams, 1977b, p.8; formerly *Wetzeliella* subgen. *Apectodinium*. This taxon was raised to the generic level by Lentin and Williams, 1977b, p.8.

augustum (Harland, 1979c, p.63, pl.2, fig.13-15) Lentin and Williams, 1981, p.14. Late Paleocene; formerly *Wetzeliella (Apectodinium)*.

caiobense (Regali *et al.*, 1974, p.290, pl.24, fig.4) Lentin and Williams, 1981, p.14. Paleocene; formerly *Hystrichosphaeridium*.

cornufruticosum Islam, 1983c, p.82, pl.1, fig.5,8. Middle Eocene.

folliculum Islam, 1983b, p.336-337, pl.1, fig.8-9. Middle Eocene.

**homomorphum* (Deflandre and Cookson, 1955, p.254, pl.5, fig.7; text-fig.19) Lentin and Williams, 1977b, p.8; emend. Harland, 1979c, p.64. Early Eocene; formerly *Wetzeliella*. Costa and Downie, 1976, p.608 designated this species as the type of *Wetzeliella* subgen. *Apectodinium*.

subsp. *"quinquelatum"* (Williams and Downie, 1966b) Lentin and Williams, 1977b, p.8. NOW *Apectodinium quinquelatum*. Originally *Wetzeliella homomorpha* var. *quinquelata;* subsequently *Wetzeliella homomorpha* subsp. *quinquelata*.

subsp. *"tesselatum"* (Châteauneuf and Gruas-Cavagnetto, 1978). NOW *Wilsonidium tesselatum*.

hyperacanthum (Cookson and Eisenack, 1965b, p.134-135, pl.16, fig.3-6) Lentin and Williams, 1977b, p.8. Paleocene; formerly *Wetzeliella*. Costa and Downie, 1976, p.609 transferred this species to *Wetzeliella* subgen. *Apectodinium*.

longispinosum (Wilson, 1968, p.59-60, fig.1-10) Bujak and Davies, 1983, p.162. Early Eocene. Originally *Deflandrea;* subsequently *Wetzeliella*.

paniculatum (Costa and Downie, 1976, p.608-609, pl.92, fig.1) Lentin and Williams, 1977b, p.9. Early Eocene; formerly *Wetzeliella*.

parvum (Alberti, 1961, p.8-9, pl.1, fig.14-18; pl.12, fig.10-11) Lentin and Williams, 1977b, p.9; emend. Harland, 1979c, p.66. Eocene; formerly *Wetzeliella*. Costa and Downie, 1976, p.609 transferred this species to *Wetzeliella* subgen. *Apectodinium*.

APECTODINIUM (cont'd)

quinquelatum (Williams and Downie, 1966b, p.191-192, pl.18, fig.7) Costa and Downie, 1979, p.43. Early Eocene. Originally *Wetzeliella homomorpha* var. *quinquelata;* subsequently *Wetzeliella homomorpha* subsp. *quinquelata,* then *Apectodinium homomorphum* subsp. *quinquelatum.*

summissum (Harland, 1979c, p.66-67. pl.1, fig.12) Lentin and Williams, 1981, p.14. Late Paleocene; formerly *Wetzeliella (Apectodinium).*

"verrucosum" This name was erroneously listed in *Apectodinium* by Lentin and Williams, 1981, p.14; in the same publication it was also correctly listed as a species of *Apteodinium.*

?williereae (Boltenhagen, 1977, p.42-43, pl.3, fig.3-6) Lentin and Williams, 1981, p.14. Paleocene; formerly *Polysphaeridium.* The provisional assignment was by Lentin and Williams, *op.cit.*

APICULADINIUM Yu Jingxian *et al.,* 1981, p.261-262.

**ovatum* Yu Jingxian *et al.,* 1981, p.262, pl.1, fig.19,28,32,35-37. Late Cretaceous.

APROBOLOCYSTA Duxbury, 1977, p.52; emend. Duxbury, 1980, p.112. Davey, 1982b, p.21 restricted *Aprobolocysta,* "to include forms that apparently possess walls of two layers, the periphragm being distinctly membranous, with or without minor antapical projections, and an apical archeopyle with deep parasulcal notch".

arguta Yu Jingxian, 1982, p.238, pl.1, fig.4. Late Jurassic-Early Cretaceous.

**eilema* Duxbury, 1977, p.52-53, pl.14, fig.4-5,8; text-fig.19. Hauterivian.

neistosa Duxbury, 1980, p.112-113, pl.2, fig.8-9; text-fig.5. Barremian.

"varigranosa" (Duxbury, 1977). NOW *Batioladinium.*

APTEA Eisenack, 1958, p.393; emend. Davey and Verdier, 1974, p.640-641; emend. Dörhöfer and Davies, 1980, p.33.

almohadensis Below, 1984, p.635, pl.1, fig.5-7. Middle to Late Aptian.

anaphrissa (Sarjeant, 1966c, p.206, pl.22, fig.8; pl.23, fig.6; text-fig.55) Sarjeant and Stover, 1978, p.51. Early Barremian. Originally *Doidyx;* subsequently *Tenua.*

"attadalica" (Cookson and Eisenack, 1962b) Davey and Verdier, 1974, p.643. NOW *Canningia;* originally *?Cyclonephelium.*

APTEA (cont'd)

eisenackii (Davey, 1969a, p.170, pl.8, fig.3-4; pl.9, fig.4; text-fig.16a-b) Davey and Verdier, 1974, p.643. Albian; formerly *Cyclonephelium*. Cookson and Eisenack, 1974, p.74 considered this species to be a *jr syn.* of *Aptea polymorpha* Eisenack. Below, 1981a, p.7 retained *Aptea eisenackii* as a distinct and separate species.

plera Duxbury, 1983, p.22,24, pl.1, fig.7-8,11; pl.10, fig.3; text-fig.5-6. Early Aptian.

**polymorpha* Eisenack, 1958, p.394, pl.22, fig.5-12; pl.24, fig.5; emend. Dörhöfer and Davies, 1980, p.34-36. Early Cretaceous.

"rugulosa" (Clarke and Verdier, 1967). NOW *Canningia.*

securigera Davey and Verdier, 1974, p.642-643, pl.91, fig.2-3; text-fig.5(vii). Early Aptian.

APTEODINIUM Eisenack, 1958, p.385. See also *Coniferatium* which is a *jr syn.* of this genus.

?albertii Lentin and Williams, 1981, p.15, *nom. subst. pro A. spinosum* (Alberti, 1961, p.24, pl.4, fig.16 (as *Pareodinia)*) Stover and Evitt, 1978, p.142 *non A. spinosum* Jain and Millepied, 1975, p.139-140. Late Barremian. Stover and Evitt, 1978, p.142 considered this (as *?Apteodinium spinosum)* to be a "provisionally accepted species". Lentin and Williams, 1981, p.15 concurred with the opinion of Stover and Evitt.

apiatum McIntyre and Brideaux, 1980, p.11-12, pl.2, fig.1-7. Valanginian.

australiense (Deflandre and Cookson, 1955, p.248, pl.5, fig.1) Williams, 1978, p.794. Middle Miocene. Originally *Gymnodinium;* subsequently *Scriniodinium.*

blandum Yu Jingxian, 1982, p.244, pl.1, fig.15. Late Jurassic-Early Cretaceous.

bucculiatum Davies, 1983, p.20, pl.4, fig.13-18; text-fig.15. Callovian-Oxfordian.

"ciliatum" Gocht, 1959, p.65, pl.8, fig.5-6. Clarke and Verdier, 1967, p.19 considered this species to be a *jr syn.* of *Trichodinium castaneum* (Deflandre) Clarke and Verdier. *"Apteodinium ciliatum"* was transferred to *Trichodinium* by Eisenack, 1964, p.811.

comptum (Duxbury, 1980, p.122-123, pl.2, fig.1-2,4) Helenes, 1984, p.132. Barremian. Originally *Gonyaulacysta;* subsequently *Cribroperidinium,* then *Acanthaulax.*

APTEODINIUM (cont'd)

"confusum" (Vozzhennikova, 1967) Helenes, 1984, p.132. Pending re-examination of the holotype, we herein reject the transfer of this species to *Apteodinium* and retain it in *?Rhynchodiniopsis*.

"conjunctum" (Eisenack and Cookson, 1960). NOW *Cribroperidinium*.

cornutum Cookson and Eisenack, 1974, p.51, pl.24, fig.9. Paleocene.

?cribrosum Cookson and Eisenack, 1968, p.112, Fig.1L. Santonian-Early Campanian. Stover and Evitt, 1978, p.142 considered this to be a "provisionally accepted species".

"emslandense" (Gerlach, 1961) Stover and Evitt, 1978, p.141. NOW and formerly *Emslandia*.

fallax (Morgenroth, 1968, p.536, pl.41, fig.4-6) Stover and Evitt, 1978, p.142. Danian; formerly *Gonyaulacysta*.

frontierense (Burgess, 1971, p.81, pl.1, fig.6,9; text-fig.13) Stover and Evitt, 1978, p.142. Albian-Early Cenomanian; formerly *Coniferatium*.

gottisii (Dupin, 1968, p.4, pl.1, fig.7-12) Helenes, 1984, p.134. Late Jurassic. Originally *Gonyaulacysta;* subsequently *?Millioudodinium*.

grande Cookson and Hughes, 1964, p.52, pl.6, fig.8-9. Late Albian-Early Cenomanian. Lentin and Williams, 1981, p.16 rejected the contention of Below, 1981, p.25 that this is a subspecies of *Apteodinium maculatum*.

**granulatum* Eisenack, 1958, p.386, pl.23, fig.8-14. Aptian.

?indicosum (Brideaux, 1971, p.83 *nom. subst. pro Palaeoperidinium granulatum* Singh, 1964, p.135, pl.18, fig.2-3) Stover and Evitt, 1978, p.142. Middle-Late Albian; formerly *Gonyaulacysta*. Stover and Evitt, 1978, p.142 considered this to be a "provisionally accepted species".

maculatum Eisenack and Cookson, 1960, p.4, pl.2, fig.1. Albian.

subsp. *"grande"* (Cookson and Hughes, 1964) Below, 1981a, p.25. Lentin and Williams, 1981, p.16 rejected this transfer and retained the taxon as a species of *Apteodinium*.

mecsekense (Nagy, 1969, p.292, pl.1, fig.6,8) Helenes, 1984, p.132. Late Pannonian. Originally *Palaeoperidinium;* subsequently *?Gonyaulacysta,* then *?Millioudodinium*.

micracanthum Cookson and Eisenack, 1974, p.51-52. Albian-Senonian. Stover and Evitt, 1978, p.142 considered this to be a "problematical species".

APTEODINIUM (cont'd)

microceratum Cookson and Eisenack, 1982, p.26, pl.1, fig.2. Latest Turonian-Coniacian.

monacanthum (Deflandre, 1935, p.227-228, pl.6, fig.1) Helenes, 1984, p.134. Senonian. Originally *Palaeoperidinium;* subsequently *Gonyaulacysta,* then *Millioudodinium.*

nanhaicum He Cheng-quan and Li Peng, 1981, p.61-62, pl.31, fig.10-12. Late Oligocene.

nuciforme (Deflandre, 1938b, p.180, pl.8, fig.4-6) Stover and Evitt, 1978, p. 142. Oxfordian. Originally *Palaeoperidinium;* subsequently *Gonyaulax,* then *Gonyaulacysta.* See *Millioudodinium.* See also *Palaeoperidinium nuciformoides* which is a *jr syn.* of this species.

reticulatum Ch. Singh, 1971, p.312, pl.47, fig.1-4. Late Albian.

"reticulatum" (Yu Jingxian, 1982). *Jr hom.* of *A. reticulatum* Ch. Singh, 1971. NOW *Apteodinium suibinense.*

"sarjeantii" (Habib, 1972) Stover and Evitt, 1978, p.142. This transfer was rejected by Lentin and Williams, 1981, p.16, who retained the species in *Archeotectatum.*

"senegalense" Stover and Evitt, 1978, p.142. This name was incorrectly designated as a *nom. subst.* for *?Apteodinium spinosum* Jain and Millepied, 1975. It was rejected by Lentin and Williams, 1981, p.17 in accordance with I.C.B.N. Art.64.

spinoreticulatum (McIntyre and Brideaux, 1980, p.15-16, pl.3, fig.4,8-12) Helenes, 1984, p.134. Valanginian; formerly *Millioudodinium.*

spinosum Jain and Millepied, 1975, p.139-140, pl.2, fig.27. Aptian-Albian. The name *Apteodinium senegalense* Stover and Evitt, 1978, p.142 as a *nom. subst.* for *Apteodinium spinosum* was rejected by Lentin and Williams, 1981, p.17 in accordance with I.C.B.N. Art. 64.

"?spinosum" (Alberti, 1961) Stover and Evitt, 1978, p.142 *non A. spinosum* Jain and Millepied, 1975, p.139-140. At the time of the transfer, Stover and Evitt, *op.cit.* considered this to be a "provisionally accepted species". The transfer of the former species from *Pareodinia* to *Apteodinium* necessitates the erection of a *nom. subst., ?A. albertii,* since *A. spinosum* Jain and Millepied has priority. See *?Apteodinium albertii.*

"spiridoides" (Benedek, 1972). NOW *Emslandia.*

"spongiosum" (McIntyre and Brideaux, 1980). NOW *Aldorfia.*

***APTEODINIUM* (cont'd)**

suibinense nom. nov., nom. subst. pro Apteodinium reticulatum Yu Jingxian, 1982, p.244, pl.1, fig.13-14 *non A. reticulatum* Singh, 1971. Late Jurassic-Early Cretaceous.

?tamboviense Vozzhennikova, 1967, p.61, pl.41, fig.1. Barremian. Stover and Evitt, 1978, p.142 considered this to be a "provisionally accepted species".

tectatum Piasecki, 1980, p.63,66, pl.2, fig.1-6. Middle Miocene.

tuberculatum Cookson and Eisenack, 1970a, p.146-147, pl.12, fig.14. Senonian.

verrucosum Oleinik, 1976a, p.85, pl.1, fig.1-3. Late Eocene. This species was also listed erroneously under *Apectodinium* in Lentin and Williams, 1981, p.14.

vescum Matsuoka, 1983b, p.139, pl.5, fig.7-8. Early-Middle Miocene.

AQUADULCUM Harland and Sarjeant, 1970, p.220-221.

myalupense (Churchill and Sarjeant, 1963, p.38-40, fig.5,22-23) Harland and Sarjeant, 1970, p.221-222. Holocene; formerly *Palaeohystrichophora*.

pikeae (Churchill and Sarjeant, 1963, p.40-41, fig.6,24) Harland and Sarjeant, 1970, p.222. Holocene; formerly *Palaeohystrichophora*.

**serpens* Harland and Sarjeant, 1970, p.221, pl.21, fig.7-8; text-fig.5. Holocene.

?yanchepense Harland and Sarjeant, 1970, p.222-223, pl.22, fig.3. Holocene. Harland and Sarjeant, *op.cit.* questionably included this species in *Aquadulcum*.

ARACHNODINIUM Wilson and Clowes, 1982, p.97-98.

**antarcticum* Wilson and Clowes, 1982, p.98-102, pl.1, fig.1-12; pl.2, fig.1-10; text-fig.2. Eocene.

ARANEOSPHAERA Eaton, 1976, p.239-240.

**araneosa* Eaton, 1976, p.240,242, pl.2, fig.5-8; text-fig.6. Middle-Late Eocene.

consociata Jain and Tandon, 1981, p.7-8, pl.2, fig.36-37; pl.3, fig.47. Middle Eocene.

stephanophora (Benedek, 1972, p.30-31, pl.9, fig.6; text-fig.10) Benedek and Sarjeant, 1981, p.349-350. Middle-Late Oligocene; formerly *?Hystrichosphaeridium*. At the time of the transfer, Benedek and Sarjeant, *op.cit.* emended the diagnosis.

ARCHEOTECTATUM Habib, 1972, p.375-376. According to Habib (pers. comm.), the wall structure of this genus differs from that found in the type of the genus *Apteodinium, A. granulatum.* Lentin and Williams, 1981, p.18 rejected the contention of Stover and Evitt, 1978, p.142 that *Archeotectatum* is a *jr syn.* of *Apteodinium.*

**sarjeantii* Habib, 1972, p.376, pl.5, fig.3-4. Oxfordian-Kimmeridgian. See also *Apteodinium.*

AREOLIGERA Lejeune-Carpentier, 1938, p.164; emend. Williams and Downie, 1966c, p.227-228.

"birama" Maier, 1959, p.304, pl.29, fig.2. Oligocene. *Jr syn.* of *Spiniferites ramosus;* see Morgenroth, 1968, p.550, and Stover and Evitt, 1978, p.190.

campoensis Caro, 1973, p.344,347-348, pl.1, fig.2. Middle Paleocene.

"cassiculus" (Drugg, 1970b). NOW *Gerdiocysta.* N.I.A.

coronata (O. Wetzel, 1933b, p.41, pl.4, fig.17) Lejeune-Carpentier, 1938, p.168. Senonian. Originally *Hystrichosphaera penicillata* forma *coronata;* subsequently *Hystrichosphaeridium coronatum.* See also *Areoligera medusettiformis* and *Areoligera rhizopodiphora* which are *jr synonyms* of this species.

crescentis Damassa, 1979b, p.192-193, pl.1, fig.1-13. Early Paleocene.

"danica" (W. Wetzel, 1952). NOW *Achomosphaera.* See also *Hystrichosphaeridium, Baltisphaeridium* and *Cleistosphaeridium.* Lejeune-Carpentier and Sarjeant, 1981, p.15 considered this species to be a *jr syn.* of *Areoligera senonensis* Lejeune-Carpentier. However, Sarjeant, 1984c, p.130 transferred the species to *Achomosphaera,* stating that the archeopyle is unquestionably single-plate precingular and the processes are gonal and intergonal.

?delicata Horowitz, 1975, p.24, pl.1, fig.2. Late Triassic. Stover and Evitt, 1978, p.19 considered this to be a "provisionally accepted species" and also erroneously included it in *Adnatosphaeridium (op.cit.,* p.15) without effecting a transfer.

"dermatica" Maier, 1959, p.305, pl.29, fig.3. Oligocene. *Jr syn.* of *Spiniferites ramosus;* see Morgenroth, 1968, p.550, and Stover and Evitt, 1978, p.190.

espiritosantensis (Regali *et al.,* 1974, p.290, pl.24, fig.3) Lentin and Williams, 1981, p.18. Maastrichtian; formerly *Hystrichosphaeridium.*

"?galea" (Maier, 1959) Davey *et al.,* 1969, p.15. See *"Galea galea".* Stover and Evitt, 1978, p.19 considered this to be a "provisionally accepted species" of *Areoligera.*

APTEODINIUM **(cont'd)**

suibinense nom. nov., nom. subst. pro Apteodinium reticulatum Yu Jingxian, 1982, p.244, pl.1, fig.13-14 *non A. reticulatum* Singh, 1971. Late Jurassic-Early Cretaceous.

?tamboviense Vozzhennikova, 1967, p.61, pl.41, fig.1. Barremian. Stover and Evitt, 1978, p.142 considered this to be a "provisionally accepted species".

tectatum Piasecki, 1980, p.63,66, pl.2, fig.1-6. Middle Miocene.

tuberculatum Cookson and Eisenack, 1970a, p.146-147, pl.12, fig.14. Senonian.

verrucosum Oleinik, 1976a, p.85, pl.1, fig.1-3. Late Eocene. This species was also listed erroneously under *Apectodinium* in Lentin and Williams, 1981, p.14.

vescum Matsuoka, 1983b, p.139, pl.5, fig.7-8. Early-Middle Miocene.

AQUADULCUM Harland and Sarjeant, 1970, p.220-221.

myalupense (Churchill and Sarjeant, 1963, p.38-40, fig.5,22-23) Harland and Sarjeant, 1970, p.221-222. Holocene; formerly *Palaeohystrichophora*.

pikeae (Churchill and Sarjeant, 1963, p.40-41, fig.6,24) Harland and Sarjeant, 1970, p.222. Holocene; formerly *Palaeohystrichophora*.

**serpens* Harland and Sarjeant, 1970, p.221, pl.21, fig.7-8; text-fig.5. Holocene.

?yanchepense Harland and Sarjeant, 1970, p.222-223, pl.22, fig.3. Holocene. Harland and Sarjeant, *op.cit.* questionably included this species in *Aquadulcum*.

ARACHNODINIUM Wilson and Clowes, 1982, p.97-98.

**antarcticum* Wilson and Clowes, 1982, p.98-102, pl.1, fig.1-12; pl.2, fig.1-10; text-fig.2. Eocene.

ARANEOSPHAERA Eaton, 1976, p.239-240.

**araneosa* Eaton, 1976, p.240,242, pl.2, fig.5-8; text-fig.6. Middle-Late Eocene.

consociata Jain and Tandon, 1981, p.7-8, pl.2, fig.36-37; pl.3, fig.47. Middle Eocene.

stephanophora (Benedek, 1972, p.30-31, pl.9, fig.6; text-fig.10) Benedek and Sarjeant, 1981, p.349-350. Middle-Late Oligocene; formerly *?Hystrichosphaeridium*. At the time of the transfer, Benedek and Sarjeant, *op.cit.* emended the diagnosis.

ARCHEOTECTATUM Habib, 1972, p.375-376. According to Habib (pers. comm.), the wall structure of this genus differs from that found in the type of the genus *Apteodinium, A. granulatum*. Lentin and Williams, 1981, p.18 rejected the contention of Stover and Evitt, 1978, p.142 that *Archeotectatum* is a *jr syn.* of *Apteodinium*.

**sarjeantii* Habib, 1972, p.376, pl.5, fig.3-4. Oxfordian-Kimmeridgian. See also *Apteodinium*.

AREOLIGERA Lejeune-Carpentier, 1938, p.164; emend. Williams and Downie, 1966c, p.227-228.

"birama" Maier, 1959, p.304, pl.29, fig.2. Oligocene. *Jr syn.* of *Spiniferites ramosus;* see Morgenroth, 1968, p.550, and Stover and Evitt, 1978, p.190.

campoensis Caro, 1973, p.344,347-348, pl.1, fig.2. Middle Paleocene.

"cassiculus" (Drugg, 1970b). NOW *Gerdiocysta.* N.I.A.

coronata (O. Wetzel, 1933b, p.41, pl.4, fig.17) Lejeune-Carpentier, 1938, p.168. Senonian. Originally *Hystrichosphaera penicillata* forma *coronata;* subsequently *Hystrichosphaeridium coronatum*. See also *Areoligera medusettiformis* and *Areoligera rhizopodiphora* which are *jr synonyms* of this species.

crescentis Damassa, 1979b, p.192-193, pl.1, fig.1-13. Early Paleocene.

"danica" (W. Wetzel, 1952). NOW *Achomosphaera.* See also *Hystrichosphaeridium, Baltisphaeridium* and *Cleistosphaeridium*. Lejeune-Carpentier and Sarjeant, 1981, p.15 considered this species to be a *jr syn.* of *Areoligera senonensis* Lejeune-Carpentier. However, Sarjeant, 1984c, p.130 transferred the species to *Achomosphaera,* stating that the archeopyle is unquestionably single-plate precingular and the processes are gonal and intergonal.

?delicata Horowitz, 1975, p.24, pl.1, fig.2. Late Triassic. Stover and Evitt, 1978, p.19 considered this to be a "provisionally accepted species" and also erroneously included it in *Adnatosphaeridium (op.cit.,* p.15) without effecting a transfer.

"dermatica" Maier, 1959, p.305, pl.29, fig.3. Oligocene. *Jr syn.* of *Spiniferites ramosus;* see Morgenroth, 1968, p.550, and Stover and Evitt, 1978, p.190.

espiritosantensis (Regali *et al.*, 1974, p.290, pl.24, fig.3) Lentin and Williams, 1981, p.18. Maastrichtian; formerly *Hystrichosphaeridium*.

"?galea" (Maier, 1959) Davey *et al.*, 1969, p.15. See *"Galea galea"*. Stover and Evitt, 1978, p.19 considered this to be a "provisionally accepted species" of *Areoligera*.

***AREOLIGERA* (cont'd)**

"incerta" (Klumpp, 1953). NOW *Spiniferites*. Gocht, 1969, p.32 considered this species to be a synonym of *Spiniferites pseudofurcatus*. Sarjeant, 1981, p.109 considered this to be a distinct and separate species of *Spiniferites*.

lemniscata (Stanley, 1965, p.229-230, pl.24, fig.1-6) Stover and Evitt, 1978, p.18. Paleocene; formerly *Cyclonephelium*.

"lychnea" (Maier, 1959) Davey *et al.*, 1969, p.15. See *"Galea lychnea"*.

"medusettiformis" (O. Wetzel, 1933b, p.41, pl.4, fig.19) Lejeune-Carpentier, 1938, p.169. Senonian. That author considered this species to be possibly conspecific with *A. rhizopodiphora*. Morgenroth, 1968, p.551 regarded *A. medusettiformis* as a *jr syn.* of *Areoligera coronata*.

"rhizopodiphora" (O. Wetzel, 1933b, p.41, pl.4, fig.18) Lejeune-Carpentier, 1938, p.169. Senonian. That author considered this species to be possibly conspecific with *A. medusettiformis*, which Morgenroth, 1968, p.551 regarded as a *jr syn.* of *Areoligera coronata*.

semicirculata (Morgenroth, 1966b, p.9-10, pl.2, fig.3-4) Stover and Evitt, 1978, p.18. Middle Oligocene; formerly *Cyclonephelium*.

**senonensis* Lejeune-Carpentier, 1938, p.164-166, text-fig.1-3. Senonian.

sentosa Eaton, 1976, p.246, pl.4, fig.1-2; pl.5, fig.1,3; text-fig.8A. Middle-Late Eocene.

tauloma Eaton, 1976, p.247, pl.4, fig.3,5; pl.5, fig.5-6; text-fig.8B. Middle-Late Eocene.

tenuicapillata (O. Wetzel, 1933b, p.42, pl.4, fig.20-22) Lejeune-Carpentier, 1938, p.167. Senonian; formerly *Hystrichosphaera*.

subsp. *"irregularis"* (O. Wetzel, 1933b, p.42-43, pl.4, fig.20) Lentin and Williams, 1973, p.16. Senonian; formerly *Hystrichosphaera tenuicapillata* forma *irregularis*. O. Wetzel, 1933b cited the same holotype for *Areoligera tenuicapillata* and *Areoligera tenuicapillata* subsp. *irregularis;* the name of the latter taxon is therefore illegitimate and correctly must be given as subsp. *tenuicapillata*.

subsp. *pinopollina* (O. Wetzel, 1933b, p.42-43, pl.4, fig.22) Lentin and Williams, 1973, p.16. Senonian; formerly *Hystrichosphaera tenuicapillata* forma *pinopollina*. Transfer of the forma to *Areoligera* was not effected by Lejeune-Carpentier, 1938, p.167, who speculated that its morphology, as reflected in the name which indicates a similarity to coniferous pollen, removed it from *Areoligera*. It may be a specimen of *?Florentinia flosculus*, in which only two large processes are preserved.

AREOLIGERA tenuicapillata **(cont'd)**

subsp. *turbilineata* (O. Wetzel, 1933b, p.42, pl.4, fig.21) Lentin and Williams, 1981, p.20. Senonian; formerly *Hystrichosphaera tenuicapillata* forma *turbilineata*. Transfer of the forma to *Areoligera* was effected by Lejeune-Carpentier, 1938, p.167.

"turbilineata" (O. Wetzel, 1933b). As pointed out by Stover and Evitt, 1978, p.19 this form has never been raised to the species level. It is a subspecies of *Areoligera tenuicapillata*.

"twistringiensis" (Maier, 1959) Davey *et al.*, 1969, p.15. See *"Galea twistringiensis"*.

"undulata" (Eaton, 1976). NOW *?Glaphyrocysta*.

vermiculata Corradini, 1973, p.159-160, pl.24, fig.6-7; pl.34, fig.5. Maastrichtian.

volata Drugg, 1967, p.21, pl.3, fig.11-13; pl.9, fig.4. Danian.

AREOSPHAERIDIUM Eaton, 1971, p.357-358.

?actinocoronatum (Benedek, 1972, p.34, pl.12, fig.13; text-fig.13) Stover and Evitt, 1978, p.20. Middle-Late Oligocene; formerly *Cleistosphaeridium*. At the time of the transfer, Stover and Evitt, *op.cit.* considered this to be a "provisionally accepted species". The holotype was illustrated in Benedek and Sarjeant, 1981, fig.10/5; text-fig.11.

arcuatum Eaton, 1971, p.360-361, pl.3, fig.1-9; text-fig.4-5. Middle Eocene. We herein reject the contention of Sarjeant, 1981, p.115-116 that this species is a *jr syn.* of *Areosphaeridium dictyostilum*. See discussion under that species.

capricornum (Cookson and Eisenack, 1965, p.128-129, pl.15, fig.1-9) Stover and Evitt, 1978, p.20. Late Eocene. Originally *Cordosphaeridium;* subsequently *?Systematophora*. We herein reject the contention of Sarjeant, 1981, p.115-116 that this species is a *jr syn.* of *Areosphaeridium dictyostilum*, because of the very distinctive nature of the processes and their arrangement in *A. capricornum*.

dictyostilum (Menendez, 1965, p.11-12, pl.2, fig.6; pl.3, fig.18-22) Sarjeant, 1981, p.115-116. Tertiary; formerly *Hystrichosphaeridium*. Eaton, 1971, p.359 considered this species to be a *jr syn.* of *Areosphaeridium diktyoplokus*. Sarjeant, 1981, p.115-116 argued that *A. dictyostilum* is actually a *sr syn.* of *Areosphaeridium arcuatum* and emended the species diagnosis, based on Eaton's, 1971 original description of *A. arcuatum*. We herein reject that emendation and synonomy in favor of maintaining the name *A. dictyostilum* for the holotype only. The inadequate nature of the illustrations does not permit one to determine if the emendation would apply to the holotype.

***AREOSPHAERIDIUM* (cont'd)**

**diktyoplokus* (Klumpp, 1953, p.392, pl.18, fig.3-7) Eaton, 1971, p.358-359. Eocene. Originally *Hystrichosphaeridium;* subsequently *Cordosphaeridium.*

subsp. *"latum"* (Klumpp, 1953) Lentin and Williams, 1973, p.16. NOW *Cordosphaeridium latum;* formerly *Hystrichosphaeridium diktyoplokus* subsp. *latum.* See also *"?Plethysyrinx latum".*

fenestratum Bujak, 1976, p.107, pl.2, fig.9-12; pl.3, fig.1-4; text-fig.3D-F. Late Eocene.

"multicornutum" Eaton, 1971, p.363-364, pl.4, fig.1-7; text-fig.6. Middle Eocene. Sarjeant, 1984b, p.83-84,86 considered this species to be a *jr syn.* of *?Areosphaeridium pectiniforme* (Gerlach) Stover and Evitt.

pectiniforme (Gerlach, 1961, p.195, pl.28, fig.14; text-fig.18) Stover and Evitt, 1978, p.20; emend. Sarjeant, 1984b, p.83-84,86. Oligocene. Originally *Baltisphaeridium;* subsequently *Cleistosphaeridium.* At the time of the transfer, Stover and Evitt, *op.cit.* considered this to be a "provisionally accepted species".

polypetellum Islam, 1983c, p.82,84, pl.2, fig.1-6. Middle Eocene.

"ARKELLIDINIUM" Beju, 1979, p.1,4. Lentin and Williams, 1981, p.21 stated that, according to Beju (personal communication), *Arkellidinium* is a *jr syn.* of the genus *Sirmiodiniopsis* Drugg. The type of the genus and single species, *Arkellidinium triapertum,* was transferred to *Sirmiodiniopsis* by Lentin and Williams, 1981, p.256. Subsequently Riley and Fenton, 1982, p.199 considered *Sirmiodiniopsis triapertum* to be a *jr syn.* of *Sirmiodiniopsis orbis* Drugg.

ARPYLORUS Calandra, 1964, p.4114; emend. Sarjeant, 1978b, p.173.

**antiquus* Calandra, 1964, p.4114, fig.1-3; emend. Sarjeant, 1978b, p.174. Silurian.

ARTEMISIOCYSTA Benedek, 1972, p.49.

**cladodichotoma* Benedek, 1972, p.49, pl.12, fig.8; text-fig.23. Middle-Late Oligocene.

zinglongtaiensis Jiabo, 1978, p.95, pl.26, fig.1. Early Tertiary.

ASCODINIUM Cookson and Eisenack, 1960a, p.5; emend. Helenes, 1983, p.258-260. Helenes, 1983, p.258 considered *Ovoidinium* Davey, 1970 and *Pocockia* Lentin and Williams, 1973 to be *jr synonyms* of *Ascodinium.* See also *Evittia.*

ASCODINIUM (cont'd)

**acrophorum* Cookson and Eisenack, 1960a, p.5, pl.1, fig.19-20. Late Albian-Cenomanian.

cinctum (Cookson and Eisenack, 1958, p.26, pl.4, fig.1-3) Helenes, 1983, p.260. Late Neocomian-Early Aptian. Originally *Deflandrea;* subsequently *Evittia,* then *Pocockia,* then *Ovoidinium.*

diversum (Davey, 1979b, p.558, pl.6, fig.6-16) Helenes, 1983, p.260. Late Aptian-Early Albian; formerly *Ovoidinium.*

?fragile Norvick, 1976 *comb. nov.*
1976 *?Ovoidinium fragile* Norvick *in* Norvick and Burger, p.88, pl.13, fig.1,8; pl.17, fig.7. Cenomanian. Helenes, 1983, p.261 considered *Ovoidinium* to be a *jr syn.* of *Ascodinium* but failed to transfer the species *?O. fragile.* Because the archeopyle type of this species is poorly understood, we questionably include it in *Ascodinium.*

"hialinum" Baltes, 1963, p.585, *nom. nud.* Holotype not designated by Baltes.

implanum (Davey, 1979b, p.558-559, pl.5, fig.7-9,11-12) Helenes, 1983, p.260. Albian; formerly *Ovoidinium.*

incomptum (Duxbury, 1983) *comb. nov.*
1983 *Ovoidinium incomptum* Duxbury, p.64, pl.10, fig.4-5; text-fig.30. Aptian.

incorporeum (Duxbury, 1983) *comb. nov.*
1983 *Ovoidinium incorporeum* Duxbury, p.65, pl.10, fig.14; text-fig.31. Late Aptian-Early Albian.

?kansanum (Tasch, 1964) *comb. nov.*
1964 *Peridinium kansanum* Tasch, p.196, pl.1, fig.1. Cenomanian. Originally *Peridinium;* subsequently *?Deflandrea,* then *?Ovoidinium.* Helenes, 1983, p.561 considered *Ovoidinium* to be a *jr syn.* of *Ascodinium* but failed to effect a transfer of this species. Because the nature of the archeopyle is poorly understood, we questionably include the species in *Ascodinium.* See Lentin and Williams, 1981, p.206 for further comments on this species.

"lordii" (Cookson and Eisenack, 1968). NOW *Senoniasphaera.*

?microreticulatum Jiabo, 1978, p.90, pl.6, fig.13. Early Tertiary. O.C. Jiabo, *op.cit.* questionably included this species in *Ascodinium.* Jiabo, *op.cit.* erroneously cited the specific name as *"midroreticulatum".*

ovale Cookson and Eisenack, 1970a, p.145, pl.13, fig.8. Albian-Cenomanian. See also *"Ovoidinium ovale".*

***ASCODINIUM* (cont'd)**

parvum (Cookson and Eisenack, 1958, p.28, pl.4, fig.12-13) Cookson and Eisenack, 1960a, p.5. Late Albian-Cenomanian; formerly *Deflandrea*.

"pontis-mariae" (Deflandre, 1936b) Deflandre, 1966, p.3. NOW *Subtilisphaera*. *Originally Gymnodinium*.

scabrosum Cookson and Hughes, 1964, p.40, pl.5, fig.1-3. Albian-Early Cenomanian; formerly *Ovoidinium*.

serratum Cookson and Eisenack, 1960a, p.5, pl.1, fig.21-22. Cenomanian.

"stagonoides" (Benedek, 1972). NOW *Senoniasphaera*.

"trendallii" (Cookson and Eisenack, 1970a). NOW *?Subtilisphaera*.

verrucosum Cookson and Hughes, 1964, p.41, pl.5, fig.4-7. Cenomanian. This species was the type of the genus *Ovoidinium*.

subsp. *ostium* (Davey, 1970) *comb. nov.*
1970 *Ovoidinium ostium* Davey, p.353, pl.4, fig.5-6; text-fig.18. Albian-Early Cenomanian. Also formerly *Ovoidinium verrucosum* var. *ostium;* then *O. verrucosum* subsp. *ostium*. Davey and Verdier, 1973, p.198 reduced *Ovoidinium ostium* to the level of variety below *O. verrucosum*. Lentin and Williams, 1975, p.2153 raised it to the subspecies level. Helenes, 1983 considered *Ovoidinium* to be a *jr syn.* of *Ascodinium* and used the original designation *Ascodinium verrucosum* but failed to transfer the subspecies.

waltonii (Pocock, 1972, p.93, pl.22, fig.13-14) Helenes, 1983. Early Jurassic. Originally *Evittia;* subsequently *Pocockia,* then *Ovoidinium*.

ASCOSTOMOCYSTIS Drugg and Loeblich, 1967, p.187. Stover and Evitt, 1978, p.289 considered this to be an acritarch genus.

gigantea Ch. Singh, 1983, p.129-130, pl.45, fig.1-2. Early Cenomanian.

granulata Châteauneuf, 1980, p.133, pl.19, fig.8,11. Late Eocene (Auversian)-Oligocene (Stampian).

**hydria* Drugg and Loeblich, 1967, p.187, pl.3, fig.13-15; text-fig.5. Early Eocene.

laevigata Châteauneuf, 1980, p.133, pl.19, fig.6,9. Late Eocene (Auversian).

maxima Ch. Singh, 1971, p.425-426, pl.79, fig.3-4. Late Albian.

potana Drugg and Loeblich, 1967, p.187-188, pl.3, fig.10-12; text-fig.6. Oligocene.

"ASTROCYSTA" Davey, 1970, p.359. Lentin and Williams, 1976, p.150 considered this genus to be a *jr syn.* of *Palaeoperidinium* Deflandre emend. Sarjeant. All species, with the exception of *A. tricuspis* (O. Wetzel, 1933a) which was returned to *Lejeunia* (now included in the genus *Phelodinium)*, have been transferred to *Palaeoperidinium*. The type of the genus *Astrocysta* was *A. cretacea* (Pocock) Davey.

ATAXIODINIUM Reid, 1974, p.588.

**choanum* Reid, 1974, p.588-589, pl.1, fig.1-2. Recent.

"ATHIGMATOCYSTA" Duxbury, 1977, p.23-24. Below, 1981a, p.48 considered this genus to be a *jr syn.* of *Endoscrinium* (Klement) Vozzhennikova. Accordingly, he transferred the type of the genus, *Athigmatocysta glabra, to Endoscrinium. Athigmatocysta granulata* (Raynaud) was transferred to *Endoscrinium* by Lentin and Williams, 1981, p.97.

ATOPODINIUM Drugg, 1978, p.62.

**prostatum* Drugg, 1978, p.63, pl.1, fig.1-7; text-fig.1A-D. Callovian-Early Oxfordian.

"AUSTRALIELLA" Vozzhennikova, 1967, p.129-130. Lentin and Williams, 1976, p.151-152 considered this genus to be a *jr syn.* of *Chatangiella* Vozzhennikova. Accordingly they transferred all the species, apart from *"Australiella cooksoniae"*, to *Chatangiella*. *"Australiella cooksoniae"* and *"Australiella spasica"* are now included in *Isabelidinium*. See below for details of species transfers.

"bondarenkoi" (Vozzhennikova, 1967). NOW *Chatangiella.*

"chetiensis" (Vozzhennikova, 1967). NOW *Chatangiella.*

"cooksoniae" (Alberti, 1959b) Vozzhennikova, 1967, p.132. NOW *Isabelidinium;* formerly *Deflandrea.*

"granulifera" (Manum, 1963) Vozzhennikova, 1967, p.132-133. NOW *Chatangiella;* formerly *Deflandrea.*

subsp. *"tenuis"* (Davey, 1970) Lentin and Williams, 1973, p.18. NOW *Chatangiella* subsp. *tenuis;* formerly *Deflandrea granulifera* var. *tenuis.* At the time of the transfer, Lentin and Williams, *op.cit.* elevated this taxon to the subspecies level.

"micracantha" (Cookson and Eisenack, 1960a) Lentin and Williams, 1973, p.18. NOW *Chatangiella;* formerly *Deflandrea.*

"spasica" (Grigorovich, 1969b). NOW *Isabelidinium.*

"AUSTRALIELLA" (cont'd)

"spectabilis" (Alberti, 1959b) Lentin and Williams, 1973, p.18. NOW *Chatangiella;* formerly *Deflandrea.*

*"*tripartita"* (Cookson and Eisenack, 1960a) Vozzhennikova, 1967, p.134-135. NOW *Chatangiella;* formerly *Deflandrea.*

"verrucosa" (Manum, 1963) Lentin and Williams, 1973, p.18. NOW *Chatangiella;* formerly *Deflandrea.*

"victoriensis" (Cookson and Manum, 1964) Lentin and Williams, 1973, p.19. NOW *Chatangiella;* formerly *Deflandrea.*

AUSTRALISPHAERA Davey, 1978, p.892; emend. Duxbury, 1983, p.25.

dolabella Duxbury, 1983, p.25-26, pl.3, fig.11; text-fig.7. Early Albian.

pannosa (Duxbury, 1980, p.129-130, pl.10, fig.3,6; text-fig.12) Duxbury, 1983, p.27. Barremian; formerly *Muderongia.*

**verrucosa* Davey, 1978, p.893, pl.2, fig.1-5. Campanian-Maastrichtian.

vitrea Duxbury, 1983, p.26-27, pl.2, fig.11; pl.3, fig.5; text-fig.8. Early Aptian.

AVELLODINIUM Duxbury, 1977, p.24. Because of the distinctive nature of the processes, Lentin and Williams, 1981, p.23 rejected the contention of Below, 1981a, p.27 that *Avellodinium* is a *jr syn.* of *Callaiosphaeridium* Davey and Williams. We herein reject the transfer of *Dichadogonyaulax culmula* to *Avellodinium* by Davey, 1982b, p.26 because that species is the type of the genus *Dichadogonyaulax* and such a transfer would result in *Avellodinium* becoming a *jr syn.* of *Dichadogonyaulax.* This was apparently not Davey's intention.

"culmulum" (Norris, 1965) Davey, 1982b, p.26. NOW and formerly *Dichadogonyaulax.* Originally *Gonyaulax.* See also *Ctenidodinium.*

**falsificum* Duxbury, 1977, p.24-26, pl.5, fig.1-3; text-fig.4. Berriasian-Barremian. Lentin and Williams, 1981, p.23 rejected the transfer of this species to *Callaiosphaeridium* by Below, 1981a, p.28.

B

"BACCHIDINIUM" Davey, 1979b, p.555. Below, 1982c, p.13-15, Davey, 1982a, p.377 and Duxbury, 1983, p.48 considered this genus to be a *jr syn.* of *Kiokansium* Stover and Evitt. The present generic assignments of the taxa formerly included in *Bacchidinium* are given below.

"**polypes*" (Cookson and Eisenack, 1962b) Davey, 1979b, p.555. NOW *Kiokansium*. Originally *Hystrichosphaeridium recurvatum* subsp. *polypes;* subsequently *Cleistosphaeridium polypes*.

subsp. *"clavulum"* (Davey, 1969a) Lentin and Williams, 1981, p.24. NOW *Cleistosphaeridium clavulum;* formerly *Cleistosphaeridium polypes* var. *clavulum*. This taxon was elevated to subspecies rank, as *Cleistosphaeridium polypes* subsp. *clavulum,* by Lentin and Williams, 1973, p.30. Davey, 1979b, p.553 did not correctly transfer this subspecies to *Bacchidinium*.

"sarmentum" (Davey, 1979b). NOW *?Kleithriasphaeridium*.

BALCATTIA Cookson and Eisenack, 1974, p.78.

cirribarbata Cookson and Eisenack, 1982, p.48, pl.8, fig.15. Late Albian-Cenomanian.

**cirrifera* Cookson and Eisenack, 1974, p.78, pl.24, fig.8; pl.28, fig.16. Albian-Cenomanian.

BALTEOCYSTA Stover and Evitt, 1978, p.226.

**perforata* (Davey, 1978, p.892 = *Aiora fenestrata* of Cookson and Eisenack, 1960a, p.9, pl.2, fig.17-18 *non Cannosphaeropsis fenestrata* Deflandre and Cookson, 1955, p.283, pl.3, fig.2) Wilson and Clowes, 1980, p.19. Turonian; formerly *Aiora*. *Jr syn.* of *Balteocysta rotula; B. perforata* is therefore the type of the genus. For discussion of name see *"Aiora perforata"*. O.C.

"rotula" Stover and Evitt, 1978, p.226 = *Aiora fenestrata* of Cookson and Eisenack, 1960a, p.9, pl.2, fig.17-18 *non Cannosphaeropsis fenestrata* Deflandre and Cookson, 1955, p.283, pl.3, fig.2. Turonian. *Jr syn.* of *Balteocysta perforata,* which is the correct name for the designated type of the genus.

BATIACASPHAERA Drugg, 1970b, p.813. The emendation of this genus by Dörhöfer and Davies, 1980, p.40 was rejected by Lentin and Williams, 1981, p.24 because of the prior erection of the genus *Sentusidinium* by Sarjeant and Stover, 1978, p.49-50. Stover and Evitt, 1978, did not emend this genus as was suggested by Burger, 1980a.

baculata Drugg, 1970b, p.814, fig.6F. Late Eocene.

"capitata" (Cookson and Eisenack, 1960b) Dörhöfer and Davies, 1980, p.40. The transfer of this species from *Tenua* to *Batiacasphaera* was rejected by Lentin and Williams, 1981, p.24, who accepted the treatment of Singh, 1971, and Stover and Evitt, 1978. Lentin and Williams, 1981, p.233 accordingly retained the species in *Prolixosphaeridium*.

?cephala (Kar, 1979, p.34, pl.4, fig.66a-b,67) Lentin and Williams, 1981, p.25. Oligocene; formerly *Polysphaeridium*. At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Batiacasphaera*. We herein reject the transfer of this species to *Sumatradinium* by Jain, 1980, p.141.

"circularis" (Cookson and Eisenack, 1971) Dörhöfer and Davies, 1980, p.40. The transfer of this species from *Canningia* to *Batiacasphaera* was rejected by Lentin and Williams, 1981, p.25, who accepted the generic circumscription of *Batiacasphaera* as given by Stover and Evitt, 1978, p.21.

**compta* Drugg, 1970b, p.813-814, fig.6A-E,7A-B. Late Eocene.

"dictydia" (Sarjeant, 1972) Davey, 1979d, p.217. NOW *Cassiculosphaeridia*. Originally *Chytroeisphaeridia;* subsequently *Escharisphaeridia*.

"echinata" (Gitmez and Sarjeant, 1972) Dörhöfer and Davies, 1980, p.40. The transfer of this species from *Tenua* to *Batiacasphaera* was rejected by Lentin and Williams, 1981, p.25, who accepted the treatment of Sarjeant and Stover, 1978. Lentin and Williams, 1981, p.253 accordingly retained the species in *Sentusidinium*.

euteiches (Davey, 1969a, p.141, pl.3, fig.8-9) Davey, 1979d, p.217. Cenomanian; formerly *Chytroeisphaeridia*.

explanata (Bujak *in* Bujak *et al*., 1980, p.44, pl.13, fig.13-14) Islam, 1983a, p.235. Late Eocene; formerly *Chytroeisphaeridia*. The transfer of this species to *Batiacasphaera* is not attributable to Matsuoka, 1984a, p.376.

hirsuta Stover, 1977, p.72-73, pl.1, fig.1-3. Middle Oligocene-Early Miocene.

macrogranulata Morgan, 1975, p.162, pl.2, fig.3a-d. Neocomian.

micropapillata Stover, 1977, p.73, pl.1, fig.7-8. Middle Oligocene-Early Miocene.

BATIACASPHAERA (cont'd)

"minor" (Cookson and Hughes, 1964) Dörhöfer and Davies, 1980, p.40. NOW *Chytroeisphaeridia*. The transfer of this species from *?Canningia* to *Batiacasphaera* was rejected by Lentin and Williams, 1981, p.25, who accepted the generic circumscription of *Batiacasphaera* as given by Stover and Evitt, 1978, p.21.

"pilosa" (Ehrenberg, 1854) Dörhöfer and Davies, 1980, p.40. The transfer of this species from *Tenua* to *Batiacasphaera* was rejected by Lentin and Williams, 1981, p.25, who accepted the treatment of Sarjeant and Stover, 1978. Lentin and Williams, 1981, p.254 accordingly retained the species in *Sentusidinium*.

reticulata (Davey, 1969b, p.14, pl.4, fig.3-4,6) Davey, 1979d, p.217. Campanian-Maastrichtian. Originally *Chytroeisphaeridia;* subsequently *Fromea*.

"ringnesiorum" (Manum and Cookson, 1964) Dörhöfer and Davies, 1980, p.40. NOW *Chytroeisphaeridia*. The transfer of this species from *?Canningia* to *Batiacasphaera* was rejected by Lentin and Williams, 1981, p.25, who accepted the generic circumscription of *Batiacasphaera* as given by Stover and Evitt, 1978, p.21. O.C.

"rioultii" (Sarjeant, 1968) Dörhöfer and Davies, 1980, p.41. The transfer of this species from *Tenua* to *Batiacasphaera* was rejected by Lentin and Williams, 1981, p.26, who accepted the treatment of Sarjeant and Stover, 1978. Lentin and Williams, 1981, p.254 accordingly retained the species in *Sentusidinium*.

"rotundata" (Cookson and Eisenack, 1961a) Dörhöfer and Davies, 1980, p.41. The transfer of this species from *?Canningia* to *Batiacasphaera* was rejected by Lentin and Williams, 1981, p.26, who accepted the generic circumscription of *Batiacasphaera* as given by Stover and Evitt, 1978, p.21.

saidensis Below, 1981a, p.26, pl.10, fig.1-2; text-fig.15. Hauterivian-Bedoulian.

scrobiculata (Deflandre and Cookson, 1955, p.291, pl.3, fig.3; text-fig.57) Burger, 1980b, p.268. Santonian-Eocene. Originally *Leiosphaera;* subsequently *Leiosphaeridia,* then *?Pyxidiella,* then *Palaeostomocystis*.

sphaerica Stover, 1977, p.73, pl.1, fig.4-6. Early Miocene.

"taugourdeaui" (Varma and Dangwal, 1964) Dörhöfer and Davies, 1980, p.41. The transfer of this species from *Tenua* to *Batiacasphaera* was rejected by Lentin and Williams, 1981, p.26, who accepted the transfer of the species from *Tenua* to *?Hemicystodinium* by Sarjeant and Stover, 1978, p.51. Lentin and Williams, 1981, also agreed with Stover and Evitt, 1978, p.209 that this species is probably conspecific with *Polysphaeridium zoharyi*.

BATIACASPHAERA (cont'd)

"torulosa" (Davey and Verdier, 1973) Dörhöfer and Davies, 1980, p.41. The transfer of this species from *Canningia* to *Batiacasphaera* was rejected by Lentin and Williams, 1981, p.26, who accepted the circumscription of *Batiacasphaera* as given by Stover and Evitt, 1978, p.21.

"verrucosa" (Sarjeant, 1968) Dörhöfer and Davies, 1980, p.41. The transfer of this species from *Tenua* to *Batiacasphaera* was rejected by Lentin and Williams, 1981, p.26, who accepted the generic treatment of Sarjeant and Stover, 1978. Lentin and Williams, 1981, p.254 accordingly retained the species in *Sentusidinium*.

"villersensis" (Sarjeant, 1968) Dörhöfer and Davies, 1980, p.41. The transfer of this species from *Tenua* to *Batiacasphaera* was rejected by Lentin and Williams, 1981, p.26, who accepted the generic treatment of Sarjeant and Stover, 1978. Lentin and Williams, 1981, p.254 accordingly retained the species in *Sentusidinium*.

BATIOLADINIUM Brideaux, 1975, p.1241. We herein reject the contention of Dörhöfer and Davies, 1980, p.36 that this genus is a *jr syn.* of *Imbatodinium*. See *Imbatodinium* for detailed discussion. The genus *"Necrobroomea"* Wiggins, 1975, is a *jr syn.* of *Batioladinium*.

?exiguum (Alberti, 1961, p.26, pl.5, fig.14) Brideaux, 1975, p.1240. Early Hauterivian. At the time of the transfer, Brideaux, *op.cit.* questionably included this species in *Batioladinium*. Originally *Broomea;* subsequently *?Batioladinium*, then *Necrobroomea*, then *Batioladinium*, then *Imbatodinium*.

fractum (Mehrotra and Sarjeant, 1984a) *comb. nov.*
1984a *Imbatodinium fractum* Mehrotra and Sarjeant, p.217-218, pl.1, fig.1-7; pl.2, fig.1-7; text-fig.1a-e. Aptian. See discussion under *Imbatodinium*.

?gochtii (Alberti, 1961, p.27, pl.5, fig.8-10,?16) Lentin and Williams, 1977b, p.14. Valanginian. Originally *Broomea;* subsequently *?Batioladinium*, then *Necrobroomea*, then *Batioladinium*, then *Imbatodinium*. At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Batioladinium*.

imbatodinense (Vozzhennikova, 1967) *comb. nov.*
1967 *Imbatodinium imbatodinense* Vozzhennikova, p.55, pl.12, fig.4a-c. Late Jurassic; also formerly *Necrobroomea*, then *?Pareodinia*. This species is transferred to *Batioladinium* because of its obvious apical archeopyle. See discussion under *Imbatodinium*.

**jaegeri* (Alberti, 1961, p.26, pl.5, fig.1-7) Brideaux, 1975, p.1240. Late Barremian. Originally *Broomea;* subsequently *Batioladinium*, then *Necrobroomea*, then *Batioladinium*, then *Imbatodinium*. See also *Pseudoceratium hansgochtii* which is a *jr syn.* of this species.

BATIOLADINIUM (cont'd)

longicornutum (Alberti, 1961, p.27, pl.5, fig.18-21; pl.6, fig.1-2) Brideaux, 1975, p.1240. Late Hauterivian-Late Barremian. Originally *Broomea;* subsequently *Batioladinium,* then *Necrobroomea,* then *Batioladinium,* then *Imbatodinium.*

micropodum (Eisenack and Cookson, 1960, p.7, pl.2, fig.8-9) Brideaux, 1975, p.1240. Albian. Originally *Broomea;* subsequently *Batioladinium,* then *Necrobroomea,* then *Batioladinium,* then *Imbatodinium.*

?pelliferum (Alberti, 1961, p.26, pl.5, fig.11-13) Brideaux, 1975, p.1240. Late Barremian-Early Aptian. Originally *Broomea;* subsequently *Batioladinium,* then *Imbatodinium.* At the time of the transfer, Brideaux, *op.cit.* questionably included this species in *Batioladinium.* Wiggins, 1975, p.111 considered this species to be a *jr syn.* of *Batioladinium micropodum.* Dörhöfer and Davies, 1980, p.38 refuted this.

pomum Davey, 1982b, p.21, pl.5, fig.2-4. Ryazanian-Early Valanginian. The transfer of this species to *Imbatodinium* by Mehrotra and Sarjeant, 1984a, p.220 is herein rejected for the reasons given under *Imbatodinium.* N.I.A.

radiculatum Davey, 1982b, p.21-22, pl.5, fig.1,7-9. Ryazanian. The transfer of this species to *Imbatodinium* by Mehrotra and Sarjeant, 1984a, p.220 is herein rejected for the reasons given under *Imbatodinium.*

?tricornoides (Alberti, 1961, p.28, pl.5, fig.17) Lentin and Williams, 1977b, p.14. Late Hauterivian. Originally *?Broomea;* subsequently *?Batioladinium,* then *Imbatodinium.* At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Batioladinium.*

varigranosum (Duxbury, 1977, p.53-54, pl.14, fig.6-7; text-fig.20) Davey, 1982b, p.22. Valanginian-Early Hauterivian; formerly *Aprobolocysta.*

BELLATUDINIUM Yu Jingxian *et al.,* 1981, p.261.

**conspicuum* Yu Jingxian *et al.,* 1981, p.261, pl.1,fig.20-22,24. Late Cretaceous.

fusum Yu Jingxian *et al.,* 1981, p.261, pl.1, fig.25-27,29-31. Late Cretaceous.

BELODINIUM Cookson and Eisenack, 1960b, p.249; emend. Dodekova, 1975, p.23.

asaphum Drugg, 1978, p.63-64, pl.2, fig.8-10. Oxfordian.

**dysculum* Cookson and Eisenack, 1960b, p.250, pl.37, fig.14; pl.39, fig.10. Probably Tithonian.

obsoletum Dodekova, 1975, p.23-24, pl.4, fig.1-2; text-fig.5. Late Bathonian.

BERINGIELLA Bujak, 1984, p.195.

**fritilla* Bujak, 1984, p.195, pl.4, fig.12-14. Late Pleistocene.

BICONIDINIUM Islam, 1983c, p.84.

**longissimum* Islam, 1983c, p.84-85, pl.1, fig.304; text-fig.10. Early Eocene.

BIORBIFERA Habib, 1972, p.377.

**johnewingii* Habib, 1972, p.377-378, pl.10, fig.2-3. Early Cretaceous.

BIPOLARIBUCINA Jiabo, 1978, p.57.

conicosa Jiabo, 1978, p.57, pl.29, fig.4-5. Early Tertiary.

huanghuaensis Jiabo, 1978, p.57, pl.29, fig.9-10. Early Tertiary.

liaoningensis Jiabo, 1978, p.58, pl.29, fig.6-8. Early Tertiary.

oblongata Jiabo, 1978, p.58, pl.29, fig.1-3. Early Tertiary.

**paradoxa* (Brosius, 1963, p.41, pl.4, fig,1,6; text-fig.2, no.1a-c) Jiabo, 1978, p.58. Late Oligocene. Originally *Hystrichosphaeridium;* subsequently *?Oligosphaeridium,* then *Tanyosphaeridium,* then *Distatodinium.*

tianjinensis Jiabo, 1978, p.59, pl.29, fig.13-14. Early Tertiary.

BITECTATODINIUM Wilson, 1973, p.351. See also *Caledonidinium* which is a *jr syn.* of this genus.

**tepikiense* Wilson, 1973, p.351-353, fig.2, no.1-12. Middle Pleistocene. See also *Caledonidinium vermiculatum* which is a *jr syn.* of this species.

BOHAIDINA Jiabo, 1978, p.37.

apicorniculа Jiabo, 1978, p.39, pl.8, fig.7. Early Tertiary.

asymmetrosa Jiabo, 1978, p.39, pl.9, fig.2. Early Tertiary.

dorsiprominentis Jiabo, 1978, p.39, pl.15, fig.1a-3c. Early Tertiary.

fusiforma Jiabo, 1978, p.39-40, pl.8, fig.6. Early Tertiary.

granulata Jiabo, 1978, p.40-41, pl.8, fig.8; pl.11, fig.1-3,5; pl.12, fig.1-8; pl.13, fig.4-9. Early Tertiary.

subsp. *biconica* Jiabo, 1978, p.40, pl.12, fig.1,4; pl.13, fig.4-9. Early Tertiary.

subsp. *granulata* Jiabo, 1978, p.40, pl.12, fig.2-3,5-8. Early Tertiary.

BOHAIDINA granulata (cont'd)

subsp. *minor* Jiabo, 1978, p.40-41, pl.11, fig.1-3. Early Tertiary.

**laevigata* Jiabo, 1978, p.38-39, pl.13, fig.1-3; pl.14, fig.1-10. Early Tertiary.

subsp. *biconica* Jiabo, 1978, p.38, pl.13, fig.3. Early Tertiary.

subsp. *laevigata* Jiabo, 1978, p.38, pl.13, fig.1-2; pl.14, fig.7-10. Early Tertiary.

subsp. *minor* Jiabo, 1978, p.38-39, pl.14, fig.1-6. Early Tertiary.

microreticulata Jiabo, 1978, p.41, pl.10, fig.1-8b. Early Tertiary.

retirugosa Jiabo, 1978, p.41, pl.7, fig.7-11; pl.8, fig.1-5; pl.9, fig.3-9; pl.10, fig.9-10; pl.11, fig.7-12. Early Tertiary.

subsp. *brachorhombica* Jiabo, 1978, p.41-42, pl.10, fig.9-10. Early Tertiary.

subsp. *minor* Jiabo, 1978, p.42, pl.11, fig.7-12. Early Tertiary.

subsp. *retirugosa* Jiabo, 1978, p.41, pl.7, fig.7-11; pl.8, fig.1-5; pl.9, fig.3-9. Early Tertiary.

rivularisa Jiabo, 1978, p.42, pl.11, fig.4. Early Tertiary.

rugosa Jiabo, 1978, p.42, pl.9, fig.1. Early Tertiary.

BOREOCYSTA Stover and Evitt, 1978, p.22-23.

**butticula* (Wiggins, 1969, p.150, pl.2, fig.1-5) Stover and Evitt, 1978, p.23. Neocomian, probably Late Valanginian or Early Hauterivian; formerly *Omatia*.

"BOSEA" He Cheng-quan and Qian Ze-shu, 1979, p.177-178 *non Bosea* Srivastava, 1975, p.19. See *Bosedinia*.

*"*granulata"* (He Cheng-quan and Qian Ze-shu, 1979). NOW *Bosedinia*.

"granorugosa" (He Cheng-quan and Qian Ze-shu, 1979). NOW *Bosedinia*.

"laevigata" (Jiabo, 1978) He Cheng-quan and Qian Ze-shu, 1979, p.179. NOW *Bosedinia;* formerly *Palaeostomocystis*. See also *"Fromea laevigata"* and *"Fromea psilata"*.

"operculata" (Jiabo, 1978) He Cheng-quan and Qian Ze-shu, 1979, p.179. NOW *Bosedinia*. He Cheng-quan and Qian Ze-shu, *op.cit.* did not correctly transfer this species from the acritarch genus *Rugosphaera* Jiabo.

BOSEDINIA He Cheng-quan, 1984b, p.172 *nom. subst. pro Bosea* He Cheng-quan and Qian Ze-shu, 1979, p.177-178.

**granulata* (He Cheng-quan and Qian Ze-shu, 1979, p.178, pl.1, fig.1-5) He Cheng-quan, 1984b, p.172. Late Eocene-Oligocene; formerly *Bosea*.

granorugosa (He Cheng-quan and Qian Ze-shu, 1979, p.178-179, pl.1, fig.12-13) He Cheng-quan, 1984b, p.173. Late Eocene-Oligocene; formerly *Bosea*.

hepuensis He Cheng-quan, 1984b, p.173-174, pl.8, fig.9-11. Tertiary.

infragranulata He Cheng-quan, 1984b, p.174, pl.6, fig.17-23. Tertiary.

laevigata (Jiabo, 1978, p.126-127, pl.32, fig.23) He Cheng-quan, 1984b, p.174. Early Tertiary. Originally *Palaeostomocystis*; subsequently *Bosea*. See also "*Fromea laevigata*" and "*Fromea psilata*".

micirugosa He Cheng-quan, 1984b, p.174-175, pl.7, fig.16-20; pl.8, fig.6-8. Tertiary.

subsp. *micirugosa* He Cheng-quan, 1984b, p.174-175, pl.7, fig.16-20. Tertiary.

subsp. *minor* He Cheng-quan, 1984b, p.175, pl.8, fig.6-8. Tertiary.

operculata (Jiabo, 1978, p.107, pl.40, fig.17-20; pl.48, fig.3a-b) He Cheng-quan, 1984b, p.175. Late Eocene-Oligocene; formerly included in the acritarch genus *Rugosphaera*. See also *Bosea*.

radiata He Cheng-quan, 1984b, p.176, pl.8, fig.23. Tertiary.

retirugosa He Cheng-quan, 1984b, p.175, pl.8, fig.1-4. Tertiary.

sunensis He Cheng-quan, 1984b, p.176, pl.7, fig.9-13. Tertiary.

tuberculata He Cheng-quan, 1984b, p.176, pl.6, fig.24. Tertiary.

verrurugosa He Cheng-quan, 1984b, p.176-177, pl.8, fig.5. Tertiary.

BOURKIDINIUM Morgan, 1975, p.160.

**granulatum* Morgan, 1975, p.160-161, pl.2, fig.2a-c. Late Aptian-Albian.

psilatum Ch. Singh, 1983, p.125, pl.42, fig.8-9; pl.43, fig.1. Early Cenomanian.

BRADLEYELLA Woollam, 1983, p.194.

**adela* (Fenton *et al.*, 1980, p.155-156, pl.14, fig.1-4; text-fig.3) Woollam, 1983, p.194. Late Bajocian. Originally *Dichadogonyaulax*; subsequently *Ctenidodinium*. O.C.

BREEDOXELLA Norris, 1978, p.12.

**caperata* (Brideaux, 1977, p.19-20, pl.7, fig.7-11) Norris, 1978, p.12. Aptian-Early Albian; formerly *Mendicodinium*.

BRIGANTEDINIUM Reid, 1977, p.432. This genus was valid when published; it is a cyst form taken from sediments of questionable age and was treated as a fossil. The contention by Harland and Reid, 1980, p.222, that a Latin diagnosis is required, does not apply to fossil forms. Harland, 1982a, p.396 designated *Brigantedinium* as a section of the extant subgenus *Protoperidinium* (Berg) Balech, 1974.

auranteum Reid, 1977, p.432-433, pl.1, fig.1. Recent.

cariacoense (Wall, 1967, p.113, pl.16, fig.13-14) Reid, 1977, p.434. Quaternary; formerly *Chytroeisphaeridia*. Harland, 1981, p.68 and Lewis *et al.*, 1984, p.30 considered this species to represent the encysted stage of *Protoperidinium avellana* (Meunier) Balech, 1974.

majusculum Reid, 1977, p.434-435, pl.1, fig.5. Recent.

**simplex* (Wall, 1965b, p.308, text-fig.7,20) Reid 1977, p.435. Recent; formerly *Chytroeisphaeridia*. This species was valid when published. The contention by Harland and Reid, 1980, p.222, that a Latin diagnosis is required, does not apply to fossil forms. Harland, 1981, p.68 and Lewis *et al.*, 1984, p.26 considered this species to represent the encysted stage of *Protoperidinium conicoides* (Paulsen) Balech, 1974.

BROOMEA Cookson and Eisenack, 1958, p.41; emend. Lentin and Williams, 1976, p.143-144. Wiggins, 1975, p.102 considered *Broomea* to be a *jr syn.* of the genus *Pareodinia* Deflandre emend. Wiggins. This was rejected by Lentin and Williams, 1976, p.144.

"exigua" (Alberti, 1961). NOW *?Batioladinium*.

"gochtii" (Alberti, 1961). NOW *?Batioladinium*.

"jaegeri" (Alberti, 1961). NOW *Batioladinium*.

"longicornuta" (Alberti, 1961). NOW *Batioladinium*.

"micropoda" (Eisenack and Cookson, 1960). NOW *Batioladinium*.

"pellifera" (Alberti, 1961). NOW *?Batioladinium*.

**ramosa* Cookson and Eisenack, 1958, p.41-42, pl.6, fig.6-8. Middle-Late Jurassic. See also *"Pareodinia ramosa"*.

"seelandica" (Lange, 1969). NOW *Manumiella*.

***BROOMEA* (cont'd)**

simplex Cookson and Eisenack, 1958, p.42, pl.6, fig.9. Late Jurassic.

"*?tricornoides*" (Alberti, 1961). NOW *?Batioladinium*. Alberti, 1961, p.28 questionably included this species in *Broomea*.

"*BROTZENIA*" Horowitz, 1975, p.25. *Jr syn.* of *Ctenidodinium* according to Stover and Evitt, 1978, p.203-204. These authors transferred the type and single species of the genus, *Brotzenia cristata*, to *?Ctenidodinium*. Fensome and Sarjeant, 1982, p.56 transferred this species to *Dichadogonyaulax*. This would effectively make *Brotzenia* a *jr syn.* of *Dichadogonyaulax*. However, Woollam, 1983, p.190 considered *?Ctenidodinium cristatum* to be a *jr syn.* of *Ctenidodinium ornatum*.

BULBODINIUM O. Wetzel, 1960, p.82. Klement, 1961, p.489-492, concluded that one species was referable to *Scriniodinium* and the remaining were species of *Deflandrea*. However, he did not effect any transfers. For complete discussion see Lentin and Williams, 1976, p.93-94.

altipetax O. Wetzel, 1960, p.83, pl.1, fig.3,5,9. Senonian.

oistoides O. Wetzel, 1960, p.83-84, pl.1, fig.6-7. Senonian.

**seitzii* O. Wetzel, 1960, p.82-83, pl.1, fig.1-2,4,8,10-13. Senonian.

BURTONIA Beju, 1983, p.106.

**polygonalis* Beju, 1983, p.107,109,111; text-fig.3,4A-F,5A-D.

C

CADDASPHAERA Fenton *et al.*, 1980, p.164.

**halosa* (Filatoff, 1975, p.91, pl.29, fig.10-11) Fenton *et al.*, 1980, p.164. Bajocian: formerly *Kalyptea*.

"CALEDONIDINIUM" Reid, 1974, p.589. Harland, 1977b, p.93 considered the type and single species of the genus, *Caledonidinium vermiculatum*, to be a *jr syn.* of *Bitectatodinium tepikiense*, thus making *Caledonidinium* a superfluous genus.

*"*vermiculatum"* Reid, 1974, p.589-590, pl.1, fig.3-5. Recent. *Jr syn.* of *Bitectatodinium tepikiense* according to Harland, 1977b, p.93.

CALIGODINIUM Drugg, 1970b, p.814-815.

aceras (Manum and Cookson, 1964, p.27-28, pl.6, fig.9-11) Lentin and Williams, 1973, p.21. Cenomanian; formerly *Kalyptea*. The transfer of this species to *Pareodinia* by Davey and Verdier, 1974, p.645, was rejected by Lentin and Williams, 1975, p.2148. Assignment to *Kalyptea*, as originally and by Jain and Millepied, 1975, p.145, is inappropriate because the archeopyle of *C. aceras* is not intercalary.

**amiculum* Drugg, 1970b, p.815, fig.8A-B,9A-E. Danian. The transfer of this species to *Kalyptea* by Jain and Millepied, 1975, p.145 was rejected by Lentin and Williams, 1977b, p.17, since *C. amiculum* has an apical archeopyle.

granulatum (Jiabo, 1978, p.91, pl.6, fig.20) Lentin and Williams, 1981, p.32. Early Tertiary; formerly *Kalyptea*.

CALLAIOSPHAERIDIUM Davey and Williams, 1966b, p.103; emend. Duxbury, 1980, p.113; emend. Below, 1981a, p.27. *"Hexasphaera"* Clarke and Verdier, 1967 is a *jr syn.* of this genus. See Clarke *et al.*, 1968, p.181. See also *Avellodinium*.

**asymmetricum* (Deflandre and Courteville, 1939, p.100, pl.4, fig.1-2) Davey and Williams, 1966b, p.104. Senonian; formerly *Hystrichosphaeridium*. Clarke and Verdier, 1967, p.43 emended the species when they transferred it to *Hexasphaera*.

***CALLAIOSPHAERIDIUM* (cont'd)**

"*falsificum*" (Duxbury, 1977) Below, 1981a, p.28. Lentin and Williams, 1981, p.32 rejected this transfer and retained the species in *Avellodinium*.

trycherium Duxbury, 1980, p.114, pl.11, fig.6,9. Barremian.

CANNINGIA Cookson and Eisenack, 1960b, p.251; emend. Dörhöfer and Davies, 1980, p.36; emend. Below, 1981a, p.30. See also *Circulodinium* which is a *jr syn.* of this genus.

americana Pöthe de Baldis and Ramos, 1983, p.432-433, pl.1, fig.6,9. Early Aptian.

"*?aspera*" (Ch. Singh, 1971). NOW *Cyclonephelium*. Stover and Evitt, 1978, p.25 considered this to be a "provisionally accepted species" of *Canningia*. See also *Epelidosphaeridia*.

attadalica (Cookson and Eisenack, 1962b, p.495, pl.5, fig.12-15) Stover and Evitt, 1978, p.24-25. Aptian-Albian. Originally *?Cyclonephelium;* subsequently *Aptea*.

"*?brevispinosa*" (Pocock, 1962) Stover and Evitt, 1978, p.25. NOW *Cyclonephelium*. Originally *Palaeohystrichophora;* subsequently *Tenua*. Stover and Evitt, 1978, p.25 considered this to be a "provisionally accepted species" of *Canningia*.

?circularis Cookson and Eisenack, 1971, p.219, pl.8, fig.6. Middle Cretaceous (probably Turonian). Stover and Evitt, 1978, p.25 considered this to be a "provisionally accepted species". See also *Batiacasphaera*.

colliveri Cookson and Eisenack, 1960b, p.251, pl.38, fig.3-4. Aptian.

compta Davey, 1982b, p.26, pl.8, fig.3-6. Portlandian.

crassicingulata Burger, 1980b, p.268, fig.4C-D. Neocomian.

dicrypta (Gitmez and Sarjeant, 1972, p.225-226, pl.7, fig.6; text-fig.22) Below, 1981a, p.31. Kimmeridgian. Originally *Meiourogonyaulax;* subsequently *Lithodinia*.

granulata Morgenroth, 1966a, p.12, pl.2, fig.10. Early Eocene. Stover and Evitt, 1978, p.25 considered this to be a "problematical species".

"*hirtella*" (Alberti, 1961) Millioud, 1969, p.425. NOW *Cyclonephelium;* formerly *Circulodinium*.

microbaculata Jiabo, 1978, p.54, pl.7, fig.1-2. Early Tertiary.

microciliata Jain, 1977, p.178, pl.3, fig.25; pl.6, fig.78. Early Albian.

CANNINGIA **(cont'd)**

"microreticulata" (Brideaux and McIntyre, 1975) Below, 1981a, p.31. Lentin and Williams, 1981, p.33 rejected this transfer and retained the species in *Senoniasphaera*.

"?minor" (Cookson and Hughes, 1964). NOW *Chytroeisphaeridia*. See also *Batiacasphaera*. Stover and Evitt, 1978, p.25 considered this to be a "provisionally accepted species" of *Canningia*.

subsp. *"psilata"* (Burger, 1980a) Lentin and Williams, 1981, p.33. NOW *Chytroeisphaeridia minor* subsp. *psilata*; formerly *Canningia minor* var. *psilata*.

"palliata" (Brideaux, 1977). NOW *Cyclonephelium*.

**reticulata* Cookson and Eisenack, 1960b, p.251, pl.38, fig.1-2; emend. Below, 1981a, p.32. Tithonian.

"?ringnesiorum" (Manum and Cookson, 1964). NOW *Chytroeisphaeridia*. Stover and Evitt, 1978, p.25 considered this to be a "provisionally accepted species" of *Canningia*. See also *Batiacasphaera ringnesiorum*.

?rotundata Cookson and Eisenack, 1961a, p.72, pl.12, fig.1-5. Senonian. See also *Batiacasphaera*. Stover and Evitt, 1978, p.25 considered this to be a "provisionally accepted species".

rugulosa (Clarke and Verdier, 1967, p.57-58, pl.12, fig.5-6; text-fig.23) Stover and Evitt, 1978, p.25. Santonian; formerly *Aptea*.

scabrosa Cookson and Eisenack, 1970a, p.146, pl.13, fig.6-7. Albian-Cenomanian.

senonica Clarke and Verdier, 1967, p.20-21, pl.1, fig.12-14; text-fig.7. Santonian.

spumosa Brideaux, 1977, p.12, pl.3, fig.9-14. Albian.

torulosa Davey and Verdier, 1973, p.180,183, pl.1, fig.2,5,8. Late Albian-Early Cenomanian. See also *Batiacasphaera* and *Ovoidinium*.

?turrita Brideaux, 1977, p.13, pl.4, fig.1-9. Barremian. Brideaux, *op.cit.* questionably included this species in *Canningia*. See also *Ovoidinium*.

CANNINGINOPSIS Cookson and Eisenack, 1962b, p.488.

**denticulata* Cookson and Eisenack, 1962b, p.488, pl.1, fig.16-19; text-fig.2. Albian-Cenomanian.

intermedia Morgan, 1980, p.18, pl.3, fig.4-8. Early Albian.

CANNINGINOPSIS **(cont'd)**

"ovalis" (Vozzhennikova, 1967). NOW *?Spinidinium.*

"tabulata" (Davey and Verdier, 1974) Duxbury, 1977, p.27. NOW *Cerbia;* formerly *Cyclonephelium.*

CANNOSPHAEROPSIS O. Wetzel, 1933b, p.6; emend. Williams and Downie, 1966c, p.222; emend. Duxbury, 1980, p.114.

"aemula" (Deflandre, 1938b) Deflandre, 1947a, p.1576. NOW *Rigaudella;* formerly *Hystrichosphaeridium.*

subsp. *"integra"* (Cookson and Eisenack, 1958). NOW *Rigaudella aemula* subsp. *integra.*

"apiculata" (Cookson and Eisenack, 1960b). NOW *Rigaudella.*

"caulleryi" (Deflandre, 1938b). NOW *Adnatosphaeridium.*

"choneta" (Cookson and Eisenack, 1962b). NOW *?Adnatosphaeridium.*

densa Cookson and Eisenack, 1962b, p.493, pl.4, fig.1-3. Late Albian-Cenomanian. Stover and Evitt, 1978, p.144 considered this to be a "problematical species".

densifilosa Cookson and Eisenack, 1974, p.70, pl.24, fig.13. Late Jurassic-Early Cretaceous. Stover and Evitt, 1978, p.144 considered this to be a "problematical species".

"densiradiata" (Cookson and Eisenack, 1962b). NOW *Nematosphaeropsis.*

"elegantula" (Drugg, 1967). NOW *Trabeculodinium.* Stover and Evitt, 1978, p.144 considered this to be a "problematical species".

"fenestrata" (Deflandre and Cookson, 1955). NOW *Aiora.*

"filamentosa" (Cookson and Eisenack, 1958). NOW *Rigaudella.*

"filifera" (Cookson and Eisenack, 1958). NOW *Adnatosphaeridium.*

franciscana Damassa, 1979b, p.204-205, pl.4, fig.9; pl.5, fig.1-11. Early Paleocene.

glabra Cookson and Eisenack, 1974, p.70, pl.24, fig.12. Middle Cretaceous. Stover and Evitt, 1978, p.144 considered this to be a "problematical species".

hyperacantha Cookson and Eisenack, 1960a, p.9, pl.2, fig.14-15. Campanian. Stover and Evitt, 1978, p.144 considered this to be a "problematical species". Below, 1982b, p.149 rejected transfer of this species to *Rigaudella* because the archeopyle type is unknown.

***CANNOSPHAEROPSIS* (cont'd)**

"mirabilis" (Cookson and Eisenack, 1958). NOW *Peridictyocysta.*

"paucispina" (Klement, 1960). NOW *Adnatosphaeridium.*

perforata" (Alberti, 1961). NOW *Rigaudella.*

"?peridictya" (Eisenack and Cookson, 1960). NOW *Hapsocysta.* Stover and Evitt, 1978, p.144 considered this to be a "provisionally accepted species" of *Cannosphaeropsis.*

"philippotii" (Deflandre, 1947a). NOW *?Nematosphaeropsis.*

?praetexta Corradini, 1973, p.163, pl.25, fig.7a-b,8; pl.35, fig.5. Late Cretaceous-Paleocene. Stover and Evitt, 1978, p.144 considered this to be a "provisionally accepted species".

pulchra Alberti, 1961, p.37, pl.10, fig.5. Coniacian. Stover and Evitt, 1978, p.144 considered this to be a "problematical species".

"pusulosa" (Morgenroth, 1966b). NOW *Trabeculodinium.* See also *Nematosphaeropsis.*

"reticulensis" (Pastiels, 1948). NOW *Adnatosphaeridium.*

"robusta" (Morgenroth, 1966a). NOW *Adnatosphaeridium.*

scaffoldi (Baksi, 1962, p.17, pl.2, fig.25) Downie and Sarjeant, 1965, p.101. Eocene; formerly *Hystrichosphaeridium.* Stover and Evitt, 1978, p.144 considered this to be a "problematical species".

speciosa Alberti, 1961, p.37, pl.9, fig.13. Late Dogger (Bathonian-Callovian). The transfer of this species to *Polystephanephorus* by Riley and Sarjeant, 1972, p.3 was rejected by Stover and Evitt, 1978, p.144.

thula Davey, 1982b, p.26-27, pl.8, fig.7-11. Ryazanian.

"tutulosa" (Cookson and Eisenack, 1960a). NOW *Adnatosphaeridium.* Stover and Evitt, 1978, p.144 considered this to be a "problematical species" of *Cannosphaeropsis.*

"urnaformis" (Cookson, 1953). NOW *Emmetrocysta.*

"ursulae" (Morgenroth, 1966a). NOW *Eatonicysta.*

**utinensis* O. Wetzel, 1933b, p.6, pl.3, fig.9-17; text-fig.12; emend. May, 1980, p.45; emend. Duxbury, 1980, p.114-115. Senonian.

CANTULODINIUM Alberti, 1961, p.23.

protuberatum Wall, 1965a, p.160, pl.4, fig.14-20; pl.8, fig.8. Pliensbachian-Toarcian. Stover and Evitt, 1978, p.98 considered this to be a "problematical species"; they further suggested that the species may be an acritarch.

**speciosum* Alberti, 1961, p.23, pl.3, fig.20-23; pl.12, fig.3. Valanginian.

CARPATELLA Grigorovich, 1969a, p.74.

**cornuta* Grigorovich, 1969a, p.74, pl.1, fig.1-6. Danian.

CARPATHODINIUM Drugg, 1978, p.64.

**predae* (Beju, 1971, p.288-289, pl.4, fig.4-7; text-fig.5) Drugg, 1978, p.64. Callovian-Oxfordian. Originally *?Meiourogonyaulax;* subsequently *?Lithodinia.*

CARPODINIUM Cookson and Eisenack, 1962b, p.489; emend. Leffingwell and Morgan, 1977, p.297.

**granulatum* Cookson and Eisenack, 1962b, p.489, pl.1, fig.6-10; emend. Leffingwell and Morgan, 1977, p.297-298. Albian.

obliquicostatum Cookson and Hughes, 1964, p.48, pl.6, fig.1-6. Late Albian-Early Cenomanian.

CASSICULOSPHAERIDIA Davey, 1969a, p.141.

altomurata Courtinat *in* Courtinat and Gaillard, 1980, p.11-12, pl.2, fig.16; pl.5, fig.7. Late Oxfordian.

dictydia (Sarjeant, 1972, p.41, pl.3, fig.3; pl.6, fig.6) Riley and Fenton, 1982, p.199. Bathonian-Callovian. Originally *Chytroeisphaeridia;* subsequently *Batiacasphaera,* then *Escharisphaeridia.*

magna Davey, 1974, p.46, pl.1, fig.3-7. Barremian.

**reticulata* Davey, 1969a, p.142, pl.3, fig.7; pl.4, fig.3. Cenomanian.

sarstedtensis Below, 1982d, p.344-345, fig.1-2. Late Aptian.

tazadensis Below, 1981a, p.33-34, pl.10, fig.8-10; pl.12, fig.16. Hauterivian-Gargasian.

CASSIDIUM Drugg, 1967, p.22.

**fragile* (Harris, 1965, p.97, pl.27, fig.4-5) Drugg, 1967, p.22. Early Eocene; formerly *Ovoidites,* a pollen genus, to which this species was originally and erroneously assigned.

***CASSIDIUM* (cont'd)**

"hexaloboeum" (Cookson and Eisenack, 1974). NOW *Cyclonephelium.*

CATASTOMOCYSTIS Ch. Singh, 1983, p.151.

microreticulata Ch. Singh, 1983, p.153, pl.53, fig.4-6. Early Cenomanian.

**spinosa* Ch. Singh, 1983, p.152, pl.55, fig.1-8; pl.56, fig.1-3; text-fig.18. Early Cenomanian.

CATILLOPSIS Drugg, 1970b, p.821.

**abdita* Drugg, 1970b, p.821, fig.17D-F,18A-C,19A-B. Early Eocene.

CAUCA Davey and Verdier, 1971, p.14. Because of the difference in archeopyle types between the two genera, we herein reject the contention of Below, 1981b, p.120-121, that *Cauca* is a *jr syn.* of *Hystrichodinium* Deflandre.

**parva* (Alberti, 1961, p.16, pl.9, fig.1-4) Davey and Verdier, 1971, p.14-15. Early Aptian-Albian; formerly *Hystrichodinium.*

?velata (W. Wetzel, 1952, p.403-404, pl.A, fig.7; text-fig.24) Sarjeant, 1984c, p.133. Paleocene. Originally *Hystrichosphaeridium oligacanthum* subsp. *velatum,* subsequently *?Cleistosphaeridium oligacanthum* subsp. *velatum.* At the time of the transfer, Sarjeant, *op.cit.,* p.133-134 emended the diagnosis and raised the taxon to the species level.

CEPADINIUM Duxbury, 1983, p.58.

**variabile* Duxbury, 1983, p.58,60, pl.9, fig.1,4,8; text-fig.27,28. Early Aptian.

CERATIOPSIS Vozzhennikova, 1963, p.181; emend. Bujak *et al.,* 1980, p.27. Lentin and Williams, 1976, p.153 considered this genus to be a *jr syn.* of *Deflandrea.* However, that view was rejected by Lentin and Williams, 1977b, p.20 because of the nature of the hexa 2a archeopyle. Lentin and Williams, 1981, p.37 also rejected the contention of Stover and Evitt, 1978, p.99 that *Ceratiopsis* is a *jr syn.* of *Deflandrea.* See also *Cerodinium* which is a *jr syn.* of this genus.

albertii (Corradini, 1973, p.174-175, pl.27, fig.7a-b,8; pl.28, fig.2) Lentin and Williams, 1977b, p.20. Late Cretaceous-Paleocene; formerly *Deflandrea.* The retention of this species in *Deflandrea* by Stover and Evitt, 1978, p.100 was rejected by Lentin and Williams, 1981, p.37.

baltica (Vozzhennikova, 1967, p.154, pl.11, fig.2a-b) Lentin and Williams, 1977b, p.20. Eocene. Originally *Cerodinium;* subsequently *Deflandrea.* The retention of this species in *Deflandrea* by Stover and Evitt, 1978, p.100 was rejected by Lentin and Williams, 1981, p.37.

***CERATIOPSIS* (cont'd)**

"boloniensis" (Riegel, 1974) Lentin and Williams, 1977b, p.20. NOW *Phelodinium.*

cordifera (May, 1980, p.74-75, pl.8, fig.4) Lentin and Williams, 1981, p.37. Maastrichtian; formerly *Deflandrea.*

crassistriata (Jain *et al.*, 1975, p.8-9, pl.6, fig.64-65) Lentin and Williams, 1977b, p.20. Danian; formerly *Deflandrea.* The retention of this species in *Deflandrea* by Stover and Evitt, 1978, p.100 was rejected by Lentin and Williams, 1981, p.37.

dartmooria (Cookson and Eisenack, 1965b, p.133-134, pl.16, fig.1-2; text-fig.1) Lentin and Williams, 1981, p.38. Paleocene; formerly *Deflandrea.*

depressa (Morgenroth, 1966a, p.8, pl.1, fig.2) Lentin and Williams, 1977b, p.20. Early Eocene; formerly *Deflandrea.* The retention of this species in *Deflandrea* by Stover and Evitt, 1978, p.100 was rejected by Lentin and Williams, 1981, p.38.

diebelii (Alberti, 1959b, p.99, pl.9, fig.18-21) Vozzhennikova, 1967, p.159. Late Senonian-Paleocene; formerly *Deflandrea.* O.C. The retention of this species in *Deflandrea* by Stover and Evitt, 1978, p.100 was rejected by Lentin and Williams, 1981, p.38.

subsp. *"brevicornis"* Vozzhennikova, 1967, p.160, *nom. nud.* (described but not figured).

subsp. *rigida* (May, 1980, p.75-76, pl.8, fig.9-10,15) Lentin and Williams, 1981, p.38. Maastrichtian; formerly *Deflandrea diebelii* subsp. *rigida.*

elongata (Jiabo, 1978, p.54-55, pl.1, fig.5-7) Lentin and Williams, 1981, p.38. Early Tertiary; formerly *Lejeunia.*

fissurata (Jiabo, 1978, p.55, pl.1, fig.4,8-10) Lentin and Williams, 1981, p.38. Early Tertiary; formerly *Lejeunia.*

granulostriata (Jain and Millepied, 1973, p.24-25, pl.1, fig.7-11; pl.2, fig. 18; pl.3, fig.29) Lentin and Williams, 1977b, p.21. Maastrichtian. Originally *Senegalinium;* subsequently *Deflandrea.* The retention of this species in *Senegalinium* by Stover and Evitt, 1978, p.123 was rejected by Lentin and Williams, 1981, p.38.

**leptoderma* Vozzhennikova, 1963, p.180; text-fig.8. Paleocene. The transfer of this species to *Deflandrea* by Lentin and Williams, 1976, p.41 was rejected by Lentin and Williams, 1977b, p.21. The retention of this species in *Deflandrea* by Stover and Evitt, 1978, p.101 was rejected by Lentin and Williams, 1981, p.38.

***CERATIOPSIS* (cont'd)**

markovae Vozzhennikova, 1967, p.159, pl.119, fig.5,7; pl.120, fig.1-4. Paleocene-Eocene. The transfer of this species to *Deflandrea* by Lentin and Williams, 1976, p.42 was rejected by Lentin and Williams, 1977b, p.21 since *C. markovae* does not have a broad hexa 2a intercalary archeopyle. The retention of this species in *Deflandrea* by Stover and Evitt, 1978, p.101 was rejected by Lentin and Williams, 1981, p.38.

obliquipes (Deflandre and Cookson, 1955, p.252, pl.4, fig.6) Lentin and Williams, 1980, p.41. Middle Paleocene-Early Eocene; formerly *?Deflandrea.*

pannucea (Stanley, 1965, p.220, pl.22, fig.1-4,8-10) Lentin and Williams, 1977b, p.21. Paleocene; formerly *Deflandrea.* The retention of this species in *?Deflandrea* by Stover and Evitt, 1978, p.101 was rejected by Lentin and Williams, 1981, p.39.

?prutensis Grigorovich, 1971, p.92,94, pl.2, fig.2. Paleocene. The transfer of this species to *?Deflandrea* by Stover and Evitt, 1978, p.101 was rejected by Lentin and Williams, 1981, p.39. Lentin and Williams, 1977b, p.21 questionably included this species in *Ceratiopsis.*

sibirica (Vozzhennikova, 1963, p.181; text-fig.9-10) Lentin and Williams, 1977b, p.21. Paleocene-Eocene. Originally *Cerodinium;* subsequently *Deflandrea.* Lentin and Williams, 1976, p.37-38 considered the genus *Cerodinium* to be a *jr syn.* of *Deflandrea* and transferred its type species *"Cerodinium sibiricum"* to that genus. Lentin and Williams, 1977b, p.21 considered the genus *Cerodinium* to be synonymous with *Ceratiopsis. Ceratiopsis* was given priority because it appeared first in the original publication (Vozzhennikova, 1963) where both genera were erected, and because the type of the genus *Ceratiopsis, C. leptoderma,* was considered to better illustrate the most important features of the plexus of fossils which make up the genus. The retention of *Ceratiopsis sibirica* in *Deflandrea* by Stover and Evitt, 1978, p.101 was rejected by Lentin and Williams, 1981, p.39.

speciosa (Alberti, 1959b, p.97, pl.9, fig.12-13) Lentin and Williams, 1977b, p.21. Late Paleocene; formerly *Deflandrea.* The retention of this species in *Deflandrea* by Stover and Evitt, 1978, p.101 was rejected by Lentin and Williams, 1981, p.39.

subsp. *glabra* (Gocht, 1969, p.10, text-fig.3) Lentin and Williams, 1977b, p.21. Late Paleocene; formerly *Deflandrea speciosa* forma *glabra.* This taxon was raised to the subspecies level by Lentin and Williams, 1973, p.45. The transfer of the subspecies to *Deflandrea* by Stover and Evitt, 1978, p.101 was rejected by Lentin and Williams, 1981, p.39.

striata (Drugg, 1967, p.18, pl.2, fig.13-17) Lentin and Williams, 1977b, p.21. Early Paleocene; formerly *Deflandrea.* The retention of this species in *Deflandrea* by Stover and Evitt, 1978, p.101 was rejected by Lentin and Williams, 1981, p.39.

CERATIOPSIS (cont'd)

subquadra (Corradini, 1973, p.175-176, pl.28, fig.1) Lentin and Williams, 1977b, p.22. Senonian; formerly *Deflandrea*. The retention of this species in *Deflandrea* by Stover and Evitt, 1978, p.101 was rejected by Lentin and Williams, 1981, p.39.

wardenensis (Williams and Downie, 1966c, p.233, pl.26, fig.5) Bujak *et al.*, 1980, p.27. Early Eocene; formerly *Deflandrea*.

warrenii (Schumacker-Lambry, 1978, p.40-41, pl.4, fig.5-6) Lentin and Williams, 1981, p.40. Paleocene (Landenian); formerly *Deflandrea*.

CERATIUM Schrank, 1793, p.34. Modern genus defined from the motile stage. Fossil cysts formerly included within this genus have been transferred to *Palaeocystodinium*. See also *Odontochitina operculata* and *?Palaeocystodinium rhomboides*.

CERATOCORYS Stein, 1883. Modern genus, all fossil forms transferred to *Microdinium*.

CERATOCYSTIDIOPSIS Deflandre, 1937b, p.89.

"incerta" (Deflandre-Rigaud, 1954). NOW *Odontochitinopsis*.

"ludbrookii" (Cookson and Eisenack, 1958). NOW *Endoceratium*.

"molesta" (Deflandre, 1937b). NOW *Odontochitinopsis*.

**simplex* Deflandre, 1937b, p.89-90, pl.17, fig.1. Late Cretaceous.

CERBIA Below, 1981a, p.8.

aucda Below, 1981a, p.8-9, pl.4, fig.3,5; pl.12, fig.20; text-fig.6a-c,g. Barremian.

**tabulata* (Davey and Verdier, 1974, p.630, pl.92, fig.1-4; pl.93, fig.6) Below, 1981a, p.9. Aptian. Originally *Cyclonephelium;* subsequently *Canninginopsis*.

CEREBROCYSTA Bujak *in* Bujak *et al.*, 1980, p.42.

**bartonensis* Bujak *in* Bujak *et al.*, 1980, p.42, pl.13, fig.4-11. Late Eocene.

"CERODINIUM" Vozzhennikova, 1963, p.181. Lentin and Williams, 1976, p.154 considered this genus to be a *jr syn.* of *Deflandrea* Eisenack; emend. Lentin and Williams. Accordingly, they transferred the two species *Cerodinium sibiricum,* the type of the genus, and *C. balticum* to *Deflandrea*. Both these species were transferred to *Ceratiopsis* by Lentin and Williams, 1977b, p.20 and 21 respectively.

CHATANGIELLA Vozzhennikova, 1967, p.128-129; emend. Lentin and Williams, 1976, p.51-52. See also *Australiella* and *Cooksoniella* which are *jr synonyms* of this genus.

?armata (Cookson and Eisenack, 1970a, p.142-143, pl.13, fig.9) Lentin and Williams, 1976, p.53. Senonian; formerly *Deflandrea.* Stover and Evitt, 1978, p.99 considered this to be a "provisionally accepted species".

?biapertura (McIntyre, 1975, p.66, pl.3, fig.5-8) Lentin and Williams, 1976, p.53. Campanian-Maastrichtian; formerly *Deflandrea.* At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Chatangiella.*

bondarenkoi (Vozzhennikova, 1967, p.130-131, pl.59, fig.1a-b; pl.60, fig.2) Lentin and Williams, 1976, p.53. Santonian; formerly *Australiella.* O.C.

campbellensis (Wilson, 1967b, p.225, fig.2-3) Lentin and Williams, 1976, p.53. Paleocene; formerly *Deflandrea.*

chetiensis (Vozzhennikova, 1967, p.131, pl.60, fig.1a-b) Lentin and Williams, 1976, p.54. Santonian; formerly *Australiella.*

coronata (McIntyre, 1975, p.64-65, pl.3, fig.1-4) Lentin and Williams, 1976, p.54. Campanian; formerly *Deflandrea.*

?dakotaensis (Stanley, 1965, p.217-218, pl.19, fig.1-3) Stover and Evitt, 1978, p.99. Paleocene. Originally *Deflandrea;* subsequently *Isabelidinium.* At the time of the transfer, Stover and Evitt, *op.cit.* considered this to be a "provisionally accepted species".

decorosa (McIntyre, 1975, p.63-64, pl.2, fig.1-4) Lentin and Williams, 1976, p.54. Campanian-Maastrichtian; formerly *Deflandrea.*

ditissima (McIntyre, 1975, p.62-63, pl.1, fig.1-4) Lentin and Williams, 1976, p.54. Santonian-Maastrichtian; formerly *Deflandrea.*

granulifera (Manum, 1963, p.61, pl.3, fig.5-9) Lentin and Williams, 1976, p.54. Senonian. Originally *Deflandrea;* subsequently *Australiella.*

subsp. *tenuis* (Davey, 1970, p.340-341, pl.2, fig.1) Lentin and Williams, 1976, p.54. Albian. Originally *Deflandrea granulifera* var. *tenuis;* subsequently *Australiella granulifera* subsp. *tenuis.* The variety was raised to the subspecies level by Lentin and Williams, 1973, p.18.

madura Lentin and Williams, 1976, p.54 *nom. subst. pro Chatangiella manumii* (Cookson and Eisenack, 1970a, p.141-142, pl.11, fig.10-11) Lentin and Williams, 1976, p.54, *non Chatangiella manumii* (Vozzhennikova, 1967, p.184-185, pl. 107, fig.1-4) Lentin and Williams, 1976, p.54. Senonian; formerly *Deflandrea manumii.*

***CHATANGIELLA* (cont'd)**

"magna" (Davey, 1970) Lentin and Williams, 1976, p.54. NOW *Isabelidinium;* formerly *Deflandrea.*

manumii (Vozzhennikova, 1967, p.184-185, pl.107, fig.1-4) Lentin and Williams, 1976, p.54. Turonian-Campanian; formerly *Cooksoniella.*

"manumii" (Cookson and Eisenack, 1970a) Lentin and Williams, 1976, p.54. NOW *Chatangiella madura;* formerly *Deflandrea manumae.*

micracantha (Cookson and Eisenack, 1960a, p.3, pl.1, fig.9) Lentin and Williams, 1976, p.54. Campanian. Originally *Deflandrea;* subsequently *Australiella.*

?multispinosa (Cookson and Eisenack, 1970a, p.141, pl.11, fig.7-9) Lentin and Williams, 1976, p.54. Albian-Cenomanian; formerly *Deflandrea.* Stover and Evitt, 1978, p.99 considered this to be a "provisionally accepted species".

**niiga* Vozzhennikova, 1967, p.129, pl.56, fig.1-4; pl.57, fig.1-4; pl.58, fig. 1-4. Santonian.

porata Aurisano, 1984, p.1-2, fig.3A-E. Late Campanian.

?robusta (Benson, 1976, p.192,200,202, pl.11, fig.9-12; pl.12, fig.1) Stover and Evitt, 1978, p.99. Late Maastrichtian; formerly *Trithyrodinium.* At the time of the transfer, Stover and Evitt, *op.cit.* considered this to be a "provisionally accepted species".

?scheii (Manum, 1963, p.56-58, pl.1, fig.1-16; text-fig.1) Lentin and Williams, 1976, p.54. Middle Cretaceous. Originally *Deflandrea;* subsequently *Cooksoniella.* Lentin and Williams, 1976, p.54 tentatively placed this species in the genus *Chatangiella* due to the presence of parasutural ridges which are not typical of the genus.

serratula (Cookson and Eisenack, 1958, p.28, pl.4, fig.4) Lentin and Williams, 1976, p.55. Campanian-Early Maastrichtian; formerly *Deflandrea.*

spectabilis (Alberti, 1959b, p.99, pl.9, fig.78) Lentin and Williams, 1976, p.55. Late Senonian. Originally *Deflandrea;* subsequently *Australiella.*

tripartita (Cookson and Eisenack, 1960a, p.2, pl.1, fig.10) Lentin and Williams, 1976, p.55. Senonian. Originally *Deflandrea;* subsequently *Australiella.* This species is the type species of *Australiella,* which Lentin and Williams, 1976, p.151 considered to be a *jr syn.* of *Chatangiella* Vozzhennikova.

***CHATANGIELLA* (cont'd)**

?tubifera (Cookson and Eisenack, 1982) *comb. nov.*
1982 *Deflandrea tubifera* Cookson and Eisenack, p.31-32, pl.3, fig.12-14. Barremian-Early Aptian. We herein questionably include this species in *Chatangiella.*

verrucosa (Manum, 1963, p.60, pl.3, fig.1-4) Lentin and Williams, 1976, p.55. Middle Cretaceous. Originally *Deflandrea;* subsequently *Australiella.* See also *Chatangiella vnigri* which is a *jr syn.* of this species.

victoriensis (Cookson and Manum, 1964, p.522, pl.76, fig.3-8) Lentin and Williams, 1976, p.55. Senonian. Originally *Deflandrea;* subsequently *Australiella.*

"vnigri" (Vozzhennikova, 1967, p.185, pl.59, fig.2; pl.79, fig.3; pl.107, fig.1; pl.109, fig.1-2; pl.110, fig.2-3) Lentin and Williams, 1976, p.55. Turonian-Santonian; formerly *Cooksoniella.* This species is the type species of *Cooksoniella,* which Lentin and Williams, 1976, p.155 considered to be a *jr syn.* of *Chatangiella* Vozzhennikova. Yun, 1981, p.66 considered this species to be a *jr syn.* of *Chatangiella verrucosa* (Manum, 1963) Lentin and Williams, 1976.

williamsii Yun, 1981, p.66-67, pl.13, fig.8,12,14. Early Santonian.

"CHELINOCYSTA" Sarjeant, 1967a, p.327, *nom. nud.* No diagnosis given. See Clarke *et al.*, 1968, p.182 for discussion. The single species, *C. lita nom. nud.*, is a synonym of *Ellipsodinium rugulosum.*

CHICHAOUADINIUM Below, 1981a, p.122-123.

**arabicum* Below, 1981a, p.123-124, pl.10, fig.11-13,15-17; text-fig.81. Albian.

boydii (Morgan, 1975, p.159-160, pl.1, fig.3a-d) Bujak and Davies, 1983, p.162. Late Aptian-Albian; formerly *Spinidinium.*

davidii (Morgan, 1975, p.157-159, pl.1, fig.1a-b,2a-d) Bujak and Davies, 1983, p.162. Aptian-Albian; formerly *Diconodinium.*

"limpidum" (Singh, 1971) Below, 1981a, p.123. See *Deflandrea limpida.*

vestitum (Brideaux, 1971, p.99-101, pl.29, fig.99-103; text-fig.10a,d) Bujak and Davies, 1983, p.162. Late Albian-Early Cenomanian. Originally *?Spinidinium;* subsequently *Deflandrea.* See also *Deflandrea limpida* which is a *jr syn.* of this species.

CHIROPTERIDIUM Gocht, 1960, p.221. See also *Galea* which is a *jr syn.* of this genus.

"aspinatum" (Gerlach, 1961) Brosius, 1963, p.48. NOW and formerly *Membranophoridium.*

CHIROPTERIDIUM **(cont'd)**

conispinum Williams, 1978, p.794,797, pl.2, fig.1-6. Oligocene.

"dispersum" Gocht, 1960, p.227, pl.18, fig.1-16; text-fig.16-27. Middle Oligocene. Sarjeant, 1983, p.108-111 considered this species to be a *jr syn.* of *Chiropteridium mespilanum.*

"galea" (Maier, 1959) Sarjeant, 1983, p.108. See *Chiropteridium mespilanum* and *Galea galea.*

"inornatum" (Drugg, 1970b). NOW *Senoniasphaera.*

"?korykum" (Maier, 1959) Lentin and Williams, 1973, p.25. See also *Galea koryka.* Sarjeant, 1983, p.91-92 reported that the holotype cannot be located on the type slide; he therefore designated the original paratype as lectotype. Based on a study of this specimen, he considered this species to be a *jr syn.* of *Spiniferites ramosus.* At the time of the transfer, Lentin and Williams, *op.cit.* questionably included the species in *Chiropteridium.*

**lobospinosum* (Gocht *in* Weiler, 1956, p.138, pl.12, fig.1-3; text-fig.8) Gocht, 1960, p.222. Middle Oligocene. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium.*

mespilanum (Maier, 1959, p.306-307, pl.29, fig.5-6) Lentin and Williams, 1973, p.26. Middle Oligocene-Middle Miocene; formerly *Galea.* Sarjeant, 1983, p.108-111 considered *Galea galea, G. mespilana* and *G. levis* to be synonymous and transferred *G. galea* to *Chiropteridium.* However, *G. galea* is a tautonym and thus illegitimate (I.C.B.N. Art. 23.4). The oldest available legitimate epithet for the morphotype is *G. mespilana* and that name is herein used in accordance with I.C.B.N. Art. 72.2. This species was emended by Sarjeant, 1983, p.108-111. See also *Chiropteridium dispersum* and *Membranophoridium multispinatum* which are *jr synonyms* of this species.

partispinatum (Gerlach, 1961, p.201, pl.29, fig.6) Brosius, 1963, p.48. Middle-Late Oligocene; formerly *Membranophoridium.*

CHLAMYDOPHORELLA Cookson and Eisenack, 1958, p.56; emend. Duxbury, 1983, p.41. See also *Gardodinium* which is a *jr syn.* of this genus.

albertii (Neale and Sarjeant, 1962, p.445-446, pl.19, fig.8; text-fig.4) Davey, 1978, p.893. Hauterivian; formerly *Gardodinium.*

"?apiculata" Cookson and Eisenack, 1970a, p.150-151, pl.13, fig.3. Albian-Cenomanian. Stover and Evitt, 1978, p.28 considered this species to be a "provisionally accepted species". Morgan, 1980, p.18-19 considered *"?C. apiculata"* to be a *jr syn.* of *Chlamydophorella nyei* Cookson and Eisenack. We concur with this opinion.

CHLAMYDOPHORELLA (cont'd)

discreta Clarke and Verdier, 1967, p.24, pl.2, fig.9-10; text-fig.9. Cenomanian.

"elongata" (Ch. Singh, 1971) Davey, 1978, p.893. The transfer of this species from *Gardodinium* to *Chlamydophorella* was rejected by Lentin and Williams, 1981, p.44. These authors agreed with Brideaux and McIntyre, 1975, p.33 that *"Gardodinium elongatum"* is a *jr syn.* of *Gardodinium eisenackii* Alberti, which is a *jr syn.* of *Gardodinium* (now *Chlamydophorella) trabeculosum* according to Davey, 1974, p.51. Although we herein accept *Gardodinium* as a *jr syn.* of *Chlamydophorella,* we still consider this species to be a *jr syn.* of *Chlamydophorella trabeculosa.*

grossa Manum and Cookson, 1964, p.17, pl.5, fig.1-2. Cenomanian.

"huguoniotii" (Valensi, 1955a) Davey, 1978, p.893. The transfer of this species to *Chlamydophorella* by Davey, *op.cit.* was rejected by Lentin and Williams, 1981, p.44, who retained the species in *Cleistosphaeridium;* see discussion in Stover and Evitt, 1978, p.32.

"lagena" Cookson and Eisenack, 1970a, p.151, pl.13, fig.4. Albian-Cenomanian. Morgan, 1980, p.18-19 considered this species to be a *jr syn.* of *Chlamydophorella nyei* Cookson and Eisenack.

largissima Ch. Singh, 1971, p.378, pl.67, fig.5-6. Middle Albian. Lentin and Williams, 1981, p.44 rejected the contention of Below, 1981a, p.34 that this is a subspecies of *Chlamydophorella nyei.*

?membranoidea Vozzhennikova, 1967, p.114-115, pl.48, fig.1-10. Late Jurassic. Stover and Evitt, 1978, p.28 considered this to be a "provisionally accepted species".

membranoperforata Below, 1982d, p.345, fig.3. Late Barremian.

**nyei* Cookson and Eisenack, 1958, p.56, pl.11, fig.1-3. Aptian-Turonian. See also *Chlamydophorella apiculata* and *Chlamydophorella lagena* which are *jr synonyms* of this species.

subsp. *"largissima"* (Ch. Singh, 1971) Below, 1981a, p.34. Lentin and Williams, 1981, p.44 rejected this transfer and retained the taxon as a species of *Chlamydophorella.*

ordinalis (Davey, 1974, p.51, pl.3, fig.5-6) Davey, 1978, p.893. Middle-Late Barremian; formerly *Gardodinium.*

pyriformis (Vozzhennikova, 1967, p.179, pl.100, fig.1,4) Davey, 1978, p.893. Barremian; formerly *Gardodinium.*

***CHLAMYDOPHORELLA* (cont'd)**

raritubula Dodekova, 1975, p.27-28, pl.1, fig.7-10; pl.6, fig.13-16; text-fig.6 Late Bathonian.

solida Morgan, 1980, p.19, pl.30, fig.7-16. Middle Aptian-basal Albian.

?tabulata Ch. Singh, 1971, p.379, pl.67, fig.7. Middle Albian. Stover and Evitt, 1978, p.28 considered this to be a "provisionally accepted species".

trabeculosa (Gocht, 1959, p.62, pl.4, fig.5) Davey, 1978, p.893. Hauterivian. Originally *Scriniodinium;* subsequently *Gardodinium*. See also *Gardodinium eisenackii* and *Gardodinium elongatum* which are *jr synonyms* of this species.

?urna Cookson and Eisenack, 1960a, p.10, pl.3, fig.7. Late Albian-Cenomanian. Stover and Evitt, 1978, p.28 considered this to be a "provisionally accepted species".

wallala Cookson and Eisenack, 1960b, p.255, pl.38, fig.13; pl.39, fig.11. Oxfordian to Early Kimmeridgian.

CHONESPHAERA Klumpp, 1953, p.395.

**incerta* Klumpp, 1953, p.395, pl.19, fig.9. Eocene.

CHYTROEISPHAERIDIA (Sarjeant, 1962a, p.492) Downie and Sarjeant, 1965, p.102; emend. Pocock, 1972, p.99-100; emend. Davey, 1979d, p.211. Originally a subgenus of *Leiosphaeridia*. See also *Tapeinosphaeridium* which is a *jr syn.* of this genus.

baetica Riegel, 1974, p.349-350,353-354, pl.1, fig.1-5; text-fig.2; emend. Riegel and Sarjeant, 1982, p.299-300. ?Senonian. This species was tentatively retained in *Chytroeisphaeridia* by Davey, 1979d, p.216. However, his concerns regarding the nature of the archeopyle were resolved by Riegel and Sarjeant, 1982.

caddaensis Filatoff, 1975, p.89-90, pl.29, fig.7-9. Bajocian.

cariacoensis" (Wall, 1967). NOW *Brigantedinium*.

cerastes Davey, 1979d, p.212,214, pl.2, fig.8-9. Early Oxfordian.

**chytroeides* (Sarjeant, 1962a, p.493, pl.70, fig.13,16) Downie and Sarjeant, 1965, p.103; emend. Davey, 1979d, p.211, Oxfordian. Originally *Leiosphaeridia (Chytroeisphaeridia)*.

"dictydia" (Sarjeant, 1972). NOW *Cassiculosphaeridia*.

"euteiches" (Davey, 1969a). NOW *Batiacasphaera*.

***CHYTROEISPHAERIDIA* (cont'd)**

"explanata" (Bujak *in* Bujak *et al.*, 1980). NOW *Batiacasphaera.*

granulata Courtinat *in* Courtinat and Gaillard, 1980, p.13-14, pl.1, fig.4,6; text-fig.2b. Late Oxfordian.

hyalina (Raynaud, 1978, p.394-395, pl.2, fig.18) Lentin and Williams, 1981, p.45. Callovian; formerly *Tapeinosphaeridium.*

"kendelbachia" (Morbey, 1975) Stover and Evitt, 1978. NOW *Heibergella;* formerly *Rhombodella.*

?mantellii Gitmez and Sarjeant, 1972, p.186, pl.1, fig.3-4; pl.12, fig.3. Early Kimmeridgian. Stover and Evitt, 1978, p.28 considered this to be a "provisionally accepted species".

minor (Cookson and Hughes, 1964, p.43, pl.8, fig.1-3,5) Morgan, 1980, p.19. Late Albian-Early Cenomanian; formerly *?Canningia.* See also *"Batiacasphaera minor".*

subsp. *psilata* (Burger, 1980a) *comb. nov.*
1980a *Canningia minor* var. *psilata* Burger, p.71, pl.26, fig.1-4. Aptian- Albian. Lentin and Williams, 1981, p.33 raised this taxon to the subspecies level.

ovata Yu Jingxian and Zhang Wangping, 1980, p.106, pl.1, fig.12-13. Late Cretaceous.

pericompsa (Ioannides *et al.*, 1977, p.463, pl.5, fig.1-4; text-fig.13) Davey, 1979d, p.216. Kimmeridgian; formerly *Tapeinosphaeridium.*

"pocockii" (Sarjeant, 1968). NOW *Escharisphaeridia.* See also *Lithodinia.*

"reticulata" (Davey, 1969b). NOW *Batiacasphaera.*

ringnesiorum (Manum and Cookson, 1964, p.15, pl.2, fig.10) Morgan, 1980, p.19. Campanian-Maastrichtian. O.C. Formerly *?Canningia.* This plural ending is necessary because the species is named in honor of the Ringnes brothers. See also *Batiacasphaera.*

rugosa Courtinat *in* Courtinat and Gaillard, 1980, p.15-16, pl.1, fig.12; pl.2, fig.1; text-fig.2d. Late Oxfordian.

scabrata Pocock, 1972, p.100, pl.27, fig.23-25. Late Bajocian. Stover and Evitt, 1978, p.28 considered this to be a "problematical species".

shangsica He Cheng-quan, 1984b, p.162, pl.8, fig.16-19. Tertiary.

"simplica" (Wall, 1965b). NOW *Brigantedinium.*

***CHYTROEISPHAERIDIA* (cont'd)**

"spinosa" (Boltenhagen, 1977). NOW *?Cleistosphaeridium.*

"?variabilis" (Pocock, 1972). NOW *Gonyaulacysta.* Lentin and Williams, 1977b, p.26 questionably retained this species in *Chytroeisphaeridia* even though Pocock, 1972 stated that it has a precingular archeopyle.

"CILIOSPHAERIDIUM" Grigorovich, 1971, p.94. *Jr syn.* of *Impletosphaeridium;* see Stover and Evitt, 1978, p.232-233. These authors transferred the type and single species of the genus, *Ciliosphaeridium cingulatum,* to *Impletosphaeridium.*

"CIRCULODINIUM" Alberti, 1961, p.28. Millioud, 1969, p.425 transferred the type of the genus, *"Circulodinium hirtellum",* to *Canningia.* Subsequently Davey, 1978, p.894 transferred *"Circulodinium hirtellum"* to *Cyclonephelium.* The remaining species, *Circulodinium deflandrei,* was considered by Millioud, 1969, p.427, to be a *jr syn.* of *Cyclonephelium distinctum* Deflandre and Cookson.

CIRRIFERA Cookson and Eisenack, 1960a, p.10. Stover and Evitt, 1978, p.290 considered this to be an acritarch genus.

**unilateralis* Cookson and Eisenack, 1960a, p.10, pl.3, fig.8. Late Albian-Cenomanian.

CLADOPYXIDIUM McLean, 1972, p.862.

exilimuratum Schumacker-Lambry, 1978, p.37, pl.2, fig.5-8. Paleocene (Landenian).

**saeptum* (Morgenroth, 1968, p.536-537, pl.41, fig.7-9; pl.42, fig.1) Stover and Evitt, 1978, p.30. Danian; formerly *Microdinium.* Stover and Evitt, *op.cit.* p.30 considered the original type of the genus *Cladopyxidium, C. septatum,* to be a *jr syn.* of *C. saeptum.* Accordingly, *C. saeptum* becomes the correct name for the nomenclatural type of the genus.

"septatum" McLean, 1972, p.862-863, pl.1, fig.1-3,5-8,10-12. Stover and Evitt, 1978, p.30 considered *Cladopyxidium septatum* to be a *jr syn.* of *Cladopyxidium saeptum* (Morgenroth) Stover and Evitt.

CLATHROCTENOCYSTIS Wiggins, 1972, p.302-303.

**elegans* Wiggins, 1972, p.303-304, pl.2-3; text-fig.3. Neocomian, probably Valanginian or Early Hauterivian.

CLEISTOSPHAERIDIUM Davey *et al.*, 1966, p.166.

?aciculare Davey, 1969a, p.158, pl.6, fig.11-12. Cenomanian. Davey, *op.cit.* questionably included this species in *Cleistosphaeridium*. Brideaux, 1971, p.93-94 stated that *?C. aciculare* is a partial synonym of *Cleistosphaeridium multispinosum* (Ch. Singh) Brideaux.

"actinocoronatum" (Benedek, 1972). NOW *?Areosphaeridium*.

"ambiguum" (Deflandre, 1937b) Jiabo, 1978, p.60. The transfer of this species from the acritarch genus *Micrhystridium* to *Cleistosphaeridium* was rejected by Lentin and Williams, 1981, p.47, because of the uncertainty of the presence of an archeopyle.

ancoriferum (Cookson and Eisenack, 1960a, p.8, pl.2, fig.11) Davey *et al.*, 1966, p.167; emend. Cookson and Eisenack, 1968, p.119-120. Albian-Cenomanian; formerly *Hystrichosphaeridium*. Clarke and Verdier, 1967, p.54 and Davey, 1978, p.893 considered this species to be a *jr syn.* of *Chlamydophorella huguoniotii* (Valensi) Davey. Clarke and Verdier included the two species in *Hystrichosphaeridium*, their original generic assignment. Cookson and Eisenack, 1974, p.66 refuted Clarke and Verdier's synonymy and retained *Cleistosphaeridium ancoriferum* as a separate species. Yun, 1981, p.44 considered this species to be a *jr syn.* of the acritarch species *Micrhystridium ambiguum* Deflandre, 1937b.

araneosum Brideaux, 1977, p.22-23, pl.9, fig.1-3. Aptian-Albian.

armatum (Deflandre, 1937b, p.76, pl.16, fig.6-7) Davey, 1969a, p.153. Late Senonian. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium.*

"ashdodense" (Rossignol, 1962, p.132, pl.2, fig.2; first figured in Rossignol, 1961, pl.1, fig.9) Davey *et al.*, 1969, p.15. Pleistocene. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium.* Wall, 1967, p.109 considered this species to be a *jr syn.* of *Lingulodinium machaerophorum.*

australe Burger, 1980b, p.268-269, fig.5C-D,6A. Neocomian.

baculatum He Cheng-quan and Li Peng, 1981, p.62, pl.34, fig.21-22. Late Oligocene.

?bahiaense (Regali *et al.*, 1974, p.289-290, pl.23, fig.5) Lentin and Williams, 1981, p.47. Eocene-Oligocene; formerly *Hystrichosphaeridium.* At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Cleistosphaeridium.*

"bergmannii" (Archangelsky, 1969a). NOW *Operculodinium.*

***CLEISTOSPHAERIDIUM* (cont'd)**

?bifide (Jiabo, 1978, p.51-52, pl.22, fig.7-16) Lentin and Williams, 1981, p.48. Early Tertiary; formerly *Tenua*. At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Cleistosphaeridium*.

bifurcatum Jiabo, 1978, p.60-61, pl.20, fig.11-12. Early Tertiary.

?brevispinosum Jain and Millepied, 1975, p.150, pl.5, fig.80-82. Early-Late Aptian. Stover and Evitt, 1978, p.31 considered this to be a "provisionally accepted species".

"*centrocarpum*" (Deflandre and Cookson, 1955) Jiabo, 1978, p.61. The transfer of this species to *Cleistosphaeridium* was rejected by Lentin and Williams, 1981, p.48, who retained it in *Operculodinium*.

clavulum (Davey, 1969a, p.154, pl.6, fig.9-10) Below, 1982c, p.15. Cenomanian. Originally *Cleistosphaeridium polypes* var. *clavulum*; subsequently *Cleistosphaeridium polypes* subsp. *clavulum*, then *Bacchidinium polypes* subsp. *clavulum*. See also *Impletosphaeridium polypes*. This species was raised to the subspecies level by Lentin and Williams, 1973, p.30. It was raised to the species level by Below, 1982c, p.15 at the time of the transfer.

commixtum Jiabo, 1978, p.61-62, pl.21, fig.3-5. Early Tertiary.

"*danicum*" (W. Wetzel, 1952) Davey *et al.*, 1969, p.15. NOW *Achomosphaera*. See also "*Areoligera danica*". Originally *Areoligera*; subsequently *Hystrichosphaeridium*, then *Baltisphaeridium*.

"*disjunctum*" Davey *et al.*, 1966, p.169, pl.11, fig.9. Reid, 1974, p.591 considered this species to be a *jr syn.* of *Lingulodinium machaerophorum* (Deflandre and Cookson) Wall.

**diversispinosum* Davey *et al.*, 1966, p.167, pl.10, fig.7. Early Eocene.

"*echinoides*" (Maier, 1959) Davey *et al.*, 1969, p.15. See "*Hystrichosphaeridium echinoides*".

ehrenbergii (Deflandre, 1947c, text-fig.1, no.5) Davey *et al.*, 1969, p.16. Oxfordian. Originally *Hystrichosphaeridium*; subsequently *Baltisphaeridium*. Stover and Evitt, 1978, p.32 considered this to be a "problematical species".

"*?erectum*" (Manum and Cookson, 1964) Stover and Evitt, 1978, p.31. NOW *?Kiokansium*. Originally *Hystrichosphaeridium*; subsequently *?Cordosphaeridium*. Stover and Evitt, 1978, p.31 considered this to be a "provisionally accepted species" of *Cleistosphaeridium*.

***CLEISTOSPHAERIDIUM* (cont'd)**

?flexuosum Davey *et al.*, 1966, p.169, pl.2, fig.5. Cenomanian. See also *?Polysphaeridium*. Davey *et al.*, *op.cit.* questionably included this species in *Cleistosphaeridium*.

giganteum (Caro, 1973, p.360-361, pl.2, fig.12) Stover and Evitt, 1978, p.31. Early Eocene; formerly *Polysphaeridium*.

granulatum Burger, 1980a, p.77, pl.33, fig.2-4,6-10. Albian.

"heteracanthum" (Deflandre and Cookson, 1955) Davey *et al.*, 1966, p.168. NOW *?Heterosphaeridium*. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium*.

huguoniotii (Valensi, 1955a, p.38, text-fig.2a) Davey, 1969a, p.135. Late Cretaceous. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium*. The transfer of this species to *Chlamydophorella* by Davey, 1978, p.893 was rejected by Lentin and Williams, 1981, p.49; see discussion in Stover and Evitt, 1978, p.32. Stover and Evitt, 1978, p.32 considered this to be a "problematical species". Yun, 1981, p.44 considered this species to be a *jr syn.* of the acritarch species *Micrhystridium ambiguum* Deflandre, 1937b.

subsp. *pertusum* (Davey, 1969a, p.156, pl.7, fig.6-7,9) Lentin and Williams, 1973, p.28. Cenomanian; formerly *Cleistosphaeridium huguoniotii* var. *pertusum*.

?insolitum (Eaton, 1976, p.308, pl.21, fig.5,8; text-fig.25B) Stover and Evitt, 1978, p.31. Early-Late Eocene; formerly *Impletosphaeridium*. Stover and Evitt, 1978, p.31 considered this to be a "provisionally accepted species".

"leve" (Maier, 1959) Davey *et al.*, 1969. A *jr syn.* of *Chiropteridium mespilanum* according to Sarjeant, 1983, p.108. See *"Galea levis"* for complete citation.

lumectum (Sarjeant, 1960a, p.139-140, pl.6, fig.1; text-fig.2) Davey *et al.*, 1969, p.16. Late Oxfordian; formerly *Baltisphaeridium*. Stover and Evitt, 1978, p.32 considered this to be a "problematical species".

mediterraneum Corradini, 1973, p.137-138, pl.19, fig.5a-b; text-fig.4. Senonian.

microcystum (Bujak *in* Bujak *et al.*, 1980, p.88,90, pl.22, fig.2-5) Lentin and Williams, 1981, p.49. Late Eocene; formerly *Tenua*.

"mikiril" Mehrotra, 1981, p.14-15, pl.1, fig.2-5. Middle Eocene. A *jr syn.* of *Lingulodinium machaerophorum* (Deflandre and Cookson) Wall according to Jain and Garg, 1983, p.61.

minus Jiabo, 1978, p.62, pl.20, fig.13-16. Early Tertiary. O.C.

CLEISTOSPHAERIDIUM (cont'd)

?mojsisovicsii Morbey, 1975, p.40, pl.15, fig.5-9. Rhaetian-Hettangian. Stover and Evitt, 1978, p.31 considered this to be a "provisionally accepted species"; they further suggested that it may be an acritarch.

?multifurcatum (Deflandre, 1937b, p.76, pl.16, fig.1-3) Davey *et al.*, 1969, p.16. Late Cretaceous. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium*. Stover and Evitt, 1978, p.31 considered this to be a "provisionally accepted species".

subsp. *latoaculeus* Yun, 1981, p.42-43, pl.11, fig.17-19. Early Santonian.

?multispinosum (Ch. Singh, 1964, p.141, pl.20, fig.1-2) Brideaux, 1971, p.93. Middle Albian-Early Cenomanian; formerly *Baltisphaeridium*. Stover and Evitt, 1978, p.31 considered this to be a "provisionally accepted species".

?nanum (Rozen, 1965, p.311, pl.2, fig.7-8; text-fig.21) Sarjeant, 1981, p.122. Late Eocene. Originally *Cordosphaeridium microtriainum* var. *nanum;* subsequently *Cordosphaeridium microtriainum* subsp. *nanum*. Sarjeant, *op.cit.* raised this taxon to the species level.

"?oligacanthum" (W. Wetzel, 1952) Davey *et al.*, 1969, p.16. NOW *Laticavodinium*. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium*. At the time of the transfer, Davey *et al.*, *op.cit.* questionably included this species in *Cleistosphaeridium*. Stover and Evitt, 1978, p.31 considered this to be a "provisionally accepted species" of *Cleistosphaeridium*.

subsp. *"complanatum"* (W. Wetzel, 1952, p.404-405, pl.A, fig.11a-b) Lentin and Williams, 1973, p.29. NOW *Solisphaeridium stimuliferum* subsp. *complanatum,* an acritarch, according to Sarjeant, 1984c, p.142. Paleocene; formerly *Hystrichosphaeridium oligacanthum* subsp. *complanatum*.

subsp. *"granulatum"* (W. Wetzel, 1952) Lentin and Williams, 1973, p.29. NOW *?Surculosphaeridium granulatum*. Originally *Hystrichosphaeridium oligacanthum* subsp. *granulatum;* subsequently *Baltisphaeridium oligacanthum* subsp. *granulatum*.

subsp. *"stella"* (W. Wetzel, 1952) Lentin and Williams, 1973, p.29. NOW *?Surculosphaeridium phoenix* subsp. *stella;* formerly *Hystrichosphaeridium oligacanthum* subsp. *stella*.

subsp. *"velatum"* (W. Wetzel, 1952) Lentin and Williams, 1973, p.29. NOW *?Cauca velata;* formerly *Hystrichosphaeridium oligacanthum* subsp. *velatum*.

CLEISTOSPHAERIDIUM **(cont'd)**

"panniforme" (Gerlach, 1961, p.196, pl.28, fig.13) Stover and Evitt, 1978, p.31. Middle Oligocene. Originally *Baltisphaeridium;* subsequently *Impletosphaeridium.* This species is regarded as a subjective *jr syn.* of *Systematophora placacantha* (Deflandre and Cookson) Davey *et al.,* by Sarjeant, 1984b, p.86-87, pl.3, fig.1 (lectotype).

panshanense Jiabo, 1978, p.63, pl.22, fig.1-6. Early Tertiary.

"parvum" Davey, 1969a, p.157, pl.7, fig.11-12. Cenomanian. A *jr syn.* of *Diacrocanthidium echinulatum* according to Bujak *in* Bujak *et al.,* 1980, p.52.

patagonicum Archangelsky, 1969b, p.200-201, pl.3, fig.9-10. Eocene. Stover and Evitt, 1978, p.32 considered this to be a "problematical species".

paucifurcatum Cookson and Eisenack, 1982, p.39-40, pl.8, fig.5-6. Paleocene.

"pectiniforme" (Gerlach, 1961) Davey *et al.,* 1969, p.16. NOW *?Areosphaeridium.* Originally *Baltisphaeridium.*

perforoconum Yun, 1981, p.43, pl.15, fig.1-4. Early Santonian.

"pilosum" (Ehrenberg, 1854). NOW *Sentusidinium.* Invalidly transferred to *Cleistosphaeridium* by Davey *et al.,* 1966, p.170.

?polyacanthum Gitmez, 1970, p.284-286, pl.12, fig.10; text-fig.22. Early Kimmeridgian. Stover and Evitt, 1978, p.31 considered this to be a "provisionally accepted species".

?polyozon (Brosius, 1963, p.45, pl.1, fig.6; pl.6, fig.5; text-fig.2a-d) Stover and Evitt, 1978, p.31-32. Late Oligocene; formerly *Baltisphaeridium.* At the time of the transfer, Stover and Evitt, *op.cit.* considered this to be a "provisionally accepted species".

"polypes" (Cookson and Eisenack, 1962b) Davey, 1969a, p.154. NOW *Kiokansium polypes;* formerly *Hystrichosphaeridium recurvatum* subsp. *polypes.* See also *Bacchidinium.*

subsp. *"clavulum"* (Davey, 1969a) Lentin and Williams, 1973, p.30. NOW *Cleistosphaeridium clavulum;* formerly *Cleistosphaeridium polypes* var. *clavulum.* See also *Bacchidinium polypes* subsp. *clavulum* and *?Kiokansium polypes* subsp. *clavulum.*

polytrichum (Valensi, 1947, p.818, text-fig.4) Davey *et al.,* 1969, p.16. Late Bathonian. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium.*

seleseyense Islam, 1983b, p.337, pl.2, fig.3,7. Middle Eocene.

***CLEISTOSPHAERIDIUM* (cont'd)**

"separatum" (McIntyre and Brideaux, 1980). NOW *Sentusidinium.*

"solidum" Yun, 1981, p.43-44, pl.11, fig.9,13-14. Early Santonian. Below, 1982c, p.16 considered this species to be a *jr syn.* of *?Kiokansium polypes.*

sphericum Horowitz, 1975, p.24, pl.1, fig.5. Late Jurassic. Stover and Evitt, 1978, p.32 considered this to be a "problematical species".

?spinosum (Boltenhagen, 1977, p.54-55, pl.7, fig.1-5) Lentin and Williams, 1981, p.51. Cenomanian-Turonian; formerly *Chytroeisphaeridia.* At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Cleistosphaeridium.*

spinulastrum Islam, 1983b, p.337-338, pl.2, fig.1-2. Middle Eocene.

spiralisetum (de Wit, 1943, p.383, text-fig.2,11) Davey *et al.,* 1969, p.16. Late Cretaceous. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium.* Stover and Evitt, 1978, p.32 considered this to be a "problematical species". The type material was not preserved.

"spissum" (McIntyre and Brideaux, 1980). NOW *?Prolixosphaeridium.*

tenue Harris, 1974, p.164, pl.2, fig.7-9. Paleocene. O.C.

tenuifilum Cookson and Eisenack, 1982, p.40, pl.8, fig.14. Paleocene.

"tiara" (Klumpp, 1953) Davey *et al.,* 1969, p.16. NOW *Operculodinium.* Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium,* then *Cordosphaeridium.*

subsp. *"centrocarpum"* (Deflandre and Cookson, 1955) Morgenroth, 1966a, p.26. NOW *Operculodinium centrocarpum.*

?tribuliferum (Sarjeant, 1962a, p.487, pl.70, fig.4; text-fig.6c-7) Davey *et al.,* 1969, p.16. Oxfordian; formerly *Baltisphaeridium.* Stover and Evitt, 1978, p.32 considered this to be a "provisionally accepted species".

"uncinispinosum" (De Coninck, 1968) Sarjeant, 1981, p.123-124. NOW *Operculodinium.* The transfer of this species from *Cordosphaeridium* to *Cleistosphaeridium* by Sarjeant, *op.cit.* is herein rejected and the species is included in *Operculodinium.*

varispinosum (Sarjeant, 1959, p.338, pl.13, fig.7; text-fig.6) Woollam and Riding, 1983, p.3. Early Callovian. Originally *Baltisphaeridium;* subsequently *Tenua,* then *?Sentusidinium.*

CLEISTOSPHAERIDIUM **(cont'd)**

?williamsii (Boltenhagen, 1977, p.41-42, pl.2, fig.6-7) Lentin and Williams, 1981, p.51. Cenomanian-Early Turonian; formerly *Polysphaeridium*. At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Cleistosphaeridium*.

COBRICOSPHAERIDIUM Harland and Sarjeant, 1970, p.216-217.

**hebes* Harland and Sarjeant, 1970, p.217-218, pl.21, fig.1-2; text-fig.2. Holocene.

spiniferum Harland and Sarjeant, 1970, p.218-220, pl.21, fig.3-6; text-fig.3-4. Holocene.

subsp. *elegans* Harland and Sarjeant, 1970, p.219-220, pl.21, fig.4-5; text-fig.4. Holocene.

subsp. *spiniferum* Harland and Sarjeant, 1970, p.218-219, pl.21, fig.3,6; text-fig.3. Holocene.

"CODONIA" Cookson and Eisenack, 1960a, p.11. *Jr hom.* of *Codonia* Huebner, 1823. SEE *Codoniella*.

CODONIELLA Cookson and Eisenack, 1961a, p.75; emend. Davey, 1979b, p.555 *(nom. subst. pro Codonia* Cookson and Eisenack, 1960a *non* Huebner, 1823).

**campanulata* (Cookson and Eisenack, 1960a, p.11, pl.3, fig.1-3) Downie and Sarjeant, 1965, p.103; emend. Davey, 1979b, p.556. Santonian; formerly *Codonia*.

?langparensis Jain *et al.*, 1975, p.12, pl.4, fig.56, pl.5, fig.57-58. Danian. Stover and Evitt, 1978, p.227 considered this to be a "provisionally accepted species".

psygma Davey, 1979b, p.556, pl.2, fig.9-14. Aptian-Albian.

"COLLUMOSPHAERA" Jain and Dutta *in* Dutta and Jain, 1980, p.70. We herein consider this genus to be a *jr syn.* of *Cyclopsiella* Drugg and Loeblich, 1967.

*"*fruticosa"* (Jain and Dutta *in* Dutta and Jain, 1980). NOW *Cyclopsiella*.

COMETODINIUM Deflandre and Courteville, 1939, p.98.

comatum Srivastava, 1984, p.29, pl.7, fig.4-8. Late Barremian.

**obscurum* Deflandre and Courteville, 1939, p.99, pl.2, fig.1. Turonian.

COMETODINIUM **(cont'd)**

?whitei (Deflandre and Courteville, 1939, p.103, pl.3, fig.5-6) Stover and Evitt, 1978, p.227. Senonian. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium,* then *Impletosphaeridium.* Stover and Evitt, 1978, p.227 considered this to be a "provisionally accepted species".

COMPARODINIUM Morbey, 1975, p.43; emend. Willie and Gocht, 1979, p.226,228.

aquilonium Dörhöfer and Davies, 1980, p.24,26, fig.26E,I;28A-H. Toarcian-Bajocian/Bathonian.

?cavum Davies, 1983, p.16, pl.2, fig.10-15; text-fig.9. Toarcian-Bajocian. Davies, *op.cit.* questionably included this species in *Comparodinium.*

diacrorhaetium Morbey, 1975, p.44, pl.16, fig.3-6; text-fig.20. Rhaetian.

**koessenium* Morbey, 1975, p.44, pl.15, fig.14; pl.16, fig.1-2; text-fig. 19a,bl. Rhaetian-Hettangian.

lineatum Wille and Gocht, 1979, p.235,237, fig.13-16,27(7-11),28(1). Pliensbachian-Toarcian.

perpunctatum Wille and Gocht, 1979, p.238, fig.28(7-8). Pliensbachian.

punctatum Wille and Gocht, 1979, p.228-231, fig.3-10,26(1-12),27(1-6). Pliensbachian-Toarcian.

subsp. *magnum* (Wille and Gocht, 1979, p.231, fig.26(11)) Lentin and Williams, 1981, p.53. Toarcian; formerly *Comparodinium punctatum* var. *magnum.*

scalatum Wille and Gocht, 1979, p.231,233-234, fig.11-12,28(2-6). Pliensbachian-Toarcian.

stipulatum Wille and Gocht, 1979, p.237-238, fig.17,28(9-12). Pliensbachian.

COMPOSITOSPHAERIDIUM Dodekova, 1974, p.25-26. When published this genus was monotypic, with *Hystrichosphaeridium costatum* Davey and Williams being its nomenclatural type. Beju, 1971, p.292 considered this species to be a *jr syn.* of *Hystrichosphaeridium polonicum* Gorka, 1965, p.306. Dodekova, 1974 did not include Beju, 1971 in her bibliography. Erkmen and Sarjeant, 1980, p.65-67 supported the synonymy given by Beju, 1971 and proposed the new name *Compositosphaeridium bulgaricum* Erkmen and Sarjeant for the specimens described and illustrated in Dodekova, 1974. They also included in the genus *C. polonicum (=C. costatum),* but proposed that *C. bulgaricum* should rightfully be considered as the type species, because it was on the basis of this material that Dodekova had formalized her concept of the new genus *Compositosphaeridium.* This is contrary, however, to the I.C.B.N., according to which a name is irrevocably linked to its nomenclatural type (even if the

COMPOSITOSPHAERIDIUM **(cont'd)**

latter may change its name as a consequence of better knowledge and understand ing). Thus, the correct name of the type species is *Compositosphaeridium polonicum* (Gorka) Erkmen and Sarjeant.

bulgaricum Erkmen and Sarjeant, 1980, p.66-67 *pro Compositosphaeridium costatum auct. non* Davey and Williams, 1966b, Dodekova, 1974, p.26-29, pl.1, fig. 1-11; pl.2, fig.1-9; text-fig.1-2, *non* Davey and Williams, 1966. Bathonian.

"costatum" (Davey and Williams, 1966b, p.62, pl.10, fig.4) Dodekova, 1974, p.26. Oxfordian. Originally *Hystrichosphaeridium;* subsequently *Cordosphaeridium.* Erkmen and Sarjeant, 1980, p.66 concurred with Beju's (1971, p.292) contention that *Hystrichosphaeridium costatum* is a *jr syn.* of *Hystrichosphaeridium polonicum* Gorka, 1965 and transferred the last named species to *Compositosphaeridium.*

**polonicum* (Gorka, 1965, p.306-307, pl.3, fig.5-6) Erkmen and Sarjeant, 1980, p.67-69. Oxfordian; formerly *Hystrichosphaeridium.* Erkmen and Sarjeant, *op.cit.* provided an emended diagnosis.

CONICOIDIUM Jiabo, 1978, p.45-46.

granorugosum Jiabo, 1978, p.46, pl.18, fig.11-12. Early Tertiary.

granulatum He Cheng-quan, 1984b, p.156-157, pl.2, fig.22-27;text-fig.1. Tertiary.

laevigatum Jiabo, 1978, p.46, pl.18, fig.1. Early Tertiary.

**tuberculatum* Jiabo, 1978, p.46, pl.18, fig.5-10; text-fig.7. Early Tertiary.

"CONIFERATIUM" Burgess, 1971, p.80-81. *Jr syn.* of *Apteodinium;* see Stover and Evitt, 1978, p.141-142, who transferred the type and single species of the genus, *C. frontierense,* to *Apteodinium.*

CONNEXIMURA May, 1980, p.45-46.

**fimbriata* (Morgenroth, 1968, p.547-548, pl.45, fig.7-8) May, 1980, p.45. Danian. Originally *?Hystrichokolpoma;* subsequently *Danea.*

CONOSPHAERIDIUM Cookson and Eisenack, 1969, p.5. The genus *Conosphaeridium* was erected by Cockson and Eisenack, 1969, p.5, with *Hystrichosphaeridium striatoconus* (Deflandre and Cookson, 1955) as the type of the genus. Sarjeant, 1969, p.14, transferred *H. striatoconus* to *?Litosphaeridium* thus making *Conosphaeridium* a superfluous genus. Lentin and Williams, 1973, p.31 rejected the transfer of Sarjeant, 1969 and retained *Conosphaeridium* as a separate genus.

CONOSPHAERIDIUM (cont'd)

abbreviatum Wilson, 1984c, p.552,554, fig.11-13. Late Santonian-Campanian.

**striatoconus* (Deflandre and Cookson, 1955, p.275, pl.2, fig.10) Cookson and Eisenack, 1969, p.5. Albian-Cenomanian. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium,* then *?Litosphaeridium.*

"*tubulosum*" (Cookson and Eisenack, 1969). NOW *Kleithriasphaeridium.*

"COOKSONIELLA" Vozzhennikova, 1967, p.183-184. Lentin and Williams, 1976, p.155 considered this genus to be a *jr syn.* of *Chatangiella* Vozzhennikova; emend. Lentin and Williams.

"*?damasii*" (Lejeune-Carpentier, 1942) Lentin and Williams, 1973, p.31. NOW *?Deflandrea;* formerly *Peridinium.* See also *Palaeoperidinium.* At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Cooksoniella.*

"*larjakiensis*" (Vozzhennikova, 1967, p.71-72, pl.16, fig.1-2) Harker and Sarjeant, 1975, p.224. NOW *Palaeoperidinium larjakiense.* Originally *Peridinium conicum* var. *larjakiensis;* subsequently *Palaeoperidinium deflandrei* subsp. *larjakiense.* The transfer of this taxon by Harker and Sarjeant, *op.cit.* to *"Cooksoniella"* was rejected by Lentin and Williams, 1977b, p.31. Species of *Palaeoperidinium,* including the type of the genus *P. pyrophorum,* commonly possess an endocyst. Therefore Harker and Sarjeant, 1975 were incorrect in assuming that the presence of an endocyst in *P. larjakiense* precludes its assignment to the genus *Palaeoperidinium.* Also, the evidence for an intercalary archeopyle resulting from the loss of paraplate 2a is inconclusive in the line drawings of Vozzhennikova, 1967, pl.16, fig.1-2.

"*manumii*" (Vozzhennikova, 1967). NOW *Chatangiella.*

"*?paleocenica*" (Cookson and Eisenack, 1965c) Lentin and Williams, 1973, p.31. NOW *Ginginodinium.* Originally *Peridinium.* See also *Palaeoperidinium.* At the time of the transfer, Lentin and Williams, *op. cit.* questionably included this species in *Cooksoniella.*

"*scheii*" (Manum, 1963) Lentin and Williams, 1973, p.31. NOW *?Chatangiella;* formerly *Deflandrea.*

"**vnigri*" (Vozzhennikova, 1967). NOW *Chatangiella.*

CORDOSPHAERIDIUM Eisenack, 1963b, p.261; emend. Davey, 1969c, p.35. We herein reject the generic emendation of Sarjeant, 1981, p.100-101 because it excludes the presence of cingular processes. According to Stover and Evitt, 1978, p.146, *Cordosphaeridium* has cingular processes. This is confirmed in Sarjeant, 1981, text-fig.1, a re-illustration of the holotype of the type species, where that author incorrectly labels the two cingular processes below the archeopyle as postcingular plates (2''' and 3''' respectively). Accordingly, the genus *Tityrosphaeridium* Sarjeant, 1981 is herein regarded as a *jr syn*. of *Cordosphaeridium*.

"axiale" (Eisenack, 1965). NOW *Fibrocysta*.

biarmatum Morgenroth, 1966a, p.21, pl.4, fig.6-7. Early Eocene. The provisional transfer of this species to *Tityrosphaeridium* by Sarjeant, 1981, p.121 is herein rejected for the reasons given under *Cordosphaeridium*.

"bipolare" (Cookson and Eisenack, 1965b). NOW *Fibrocysta*.

?callosum Morgenroth, 1966a, p.21, pl.4, fig.8-10. Early Eocene. Stover and Evitt, 1978, p.147 considered this to be a "provisionally accepted species". The provisional transfer of this species to *Tityrosphaeridium* by Sarjeant, 1981, p.121 is herein rejected for the reasons given under *Cordosphaeridium*.

cantharellum (Brosius, 1963, p.41, pl.6, fig.1) Gocht, 1969, p.45. Late Oligocene; formerly *Hystrichosphaeridium*. The transfer of this species to *Tityrosphaeridium* by Sarjeant, 1981, p.120 is herein rejected for the reasons given under *Cordosphaeridium*.

capillaceum Schumacker-Lambry, 1978, p.37-38, pl.2, fig.10-12. Paleocene (Landenian).

"capricornum" (Cookson and Eisenack, 1965a). NOW *Areosphaeridium*.

commune Corradini, 1973, p.151, pl.22, fig.1a-b; pl.33, fig.1-2. Late Cretaceous-Paleocene. The transfer of this species to *Achomosphaera* by Sarjeant, 1981, p.122 is herein rejected.

"costatum" (Davey and Williams, 1966b) Gorka, 1970, p.489-490. NOW *Compositosphaeridium*.

?cracenospinosum Davey and Williams, 1966b, p.87, pl.3, fig.4. Early Eocene. Stover and Evitt, 1978, p.147 considered this to be a "provisionally accepted species". The transfer of this species to *?Achomosphaera* by Sarjeant, 1981, p.123 is herein rejected, because of the nature of the processes.

"diktyoplokus" (Klumpp, 1953) Eisenack, 1963b, p.262. NOW *Areosphaeridium*.

subsp. *"latum"* (Klumpp, 1953) Eisenack, 1963b, p.262. NOW *Cordosphaeridium latum*.

***CORDOSPHAERIDIUM* (cont'd)**

"divergens" (Eisenack, 1954) Eisenack, 1963b, p.262. NOW *Operculodinium*. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium*.

"eoinodes" (Eisenack, 1958) Eisenack, 1963b, p.262. NOW *Kleithriasphaeridium;* formerly *Hystrichosphaeridium*.

"?erectum" (Manum and Cookson, 1964) Davey and Williams, 1969, p.6. NOW *?Kiokansium;* formerly *Hystrichosphaeridium*. At the time of the transfer, Davey and Williams, *op.cit.* questionably included this species in *Cordosphaeridium*.

exilimurum Davey and Williams, 1966b, p.87, pl.11, fig.2. Early Eocene. The transfer of this species to *?Hystrichosphaerina* by Sarjeant, 1981, p.122 is herein rejected, since the archeopyle in that genus is apical.

"?fasciatum" (Davey and Williams, 1966b). NOW *Kleithriasphaeridium*. Davey and Williams, 1966b, p.90 questionably included this species in *Cordosphaeridium*.

?fibroferum Cookson and Eisenack, 1982, p.40, pl.5, fig.6-9. Albian-Cenomanian. This species may be a *sr syn.* of *Florentinia verdierii* Ch. Singh, 1983. Cookson and Eisenack, 1982, p.40 questionably included this species in *Cordosphaeridium*.

fibrospinosum Davey and Williams, 1966b, p.86, pl.5, fig.5. Early Eocene. The transfer of this species to *?Emmetrocysta* by Sarjeant, 1981, p.123 is herein rejected, since the archeopyle in that genus is apical.

"filosum" (Wilson, 1967a). NOW *Turbiosphaera*.

"floripes" (Deflandre and Cookson, 1955) Eisenack, 1963b, p.262. NOW *Homotryblium*.

subsp. *"breviradiatum"* (Cookson and Eisenack, 1961b) Eisenack, 1963, p.262. NOW *Homotryblium floripes* subsp. *breviradiatum*.

funiculatum Morgenroth, 1966a, p.22-23, pl.6, fig.2-3. Early Eocene. The provisional transfer of this species to *Tityrosphaeridium* by Sarjeant, 1981, p.121 is herein rejected for the reasons given under *Cordosphaeridium*.

gracile (Eisenack, 1954, p.66, pl.8, fig.17; pl.10, fig.3-8; pl.12, fig. 7,21) Davey and Williams, 1966b, p.84. Oligocene. Originally *Hystrichosphaeridium inodes* subsp. *gracile;* subsequently *Cordosphaeridium inodes* subsp. *gracile*. The transfer of this species to *Tityrosphaeridium* by Sarjeant, 1981, p.121 is herein rejected for the reasons given under *Cordosphaeridium*.

CORDOSPHAERIDIUM **(cont'd)**

?hirundo (Eisenack, 1958, p.404-405, pl.24, fig.12) Stover and Evitt, 1978, p.147. Early Cretaceous. Originally *Hystrichosphaeridium;* subsequently *Achomosphaera,* then *Lanternosphaeridium.* Stover and Evitt, 1978, p.47 considered this to be a "provisionally accepted species". The transfer of this species to *?Spiniferites* by Sarjeant, 1981, p.123 is herein rejected, because of the nature and distribution of the processes.

**inodes* (Klumpp, 1953, p.391, pl.18, fig.1-2) Eisenack, 1963b, p.261; emend. Morgenroth, 1968, p.549-550. Late Eocene; formerly *Hystrichosphaeridium.* The emendation of this species by Sarjeant, 1981, p.102-105 is herein rejected for the reasons given under *Cordosphaeridium.*

subsp. *"gracile"* (Eisenack, 1954) Eisenack, 1963b, p.261. NOW *Cordosphaeridium gracile.*

subsp. *longipes* Hansen, 1977, p.17,19, fig.17C-E. Early Paleocene.

subsp. *"minimum"* (Morgenroth, 1966a). NOW *Cordosphaeridium minimum.*

subsp. *"minus"* (Morgenroth, 1966a). NOW *Cordosphaeridium minus.*

subsp. *"robustum"* (Gocht, 1969). NOW *Cordosphaeridium robustum.*

"klumppiae" (Corradini, 1973). NOW *Fibrocysta.*

"latispinosum" (Davey and Williams, 1966b). NOW *Achilleodinium.* The provisional transfer of this species to *Tityrosphaeridium* by Sarjeant, 1981, p.121 is herein rejected for the reasons given under *Cordosphaeridium.*

latum (Klumpp, 1953) *comb. nov.*
1953 *Hystrichosphaeridium diktyoplokus* subsp. *latum* Klumpp, p.392, pl.18, fig.8-10. Eocene; also formerly *Cordosphaeridium diktyoplokus* subsp. *latum,* then *Areosphaeridium diktyoplokus* subsp. *latum,* then *"Plethysyrinx" lata.* Sarjeant, 1981, p.106-107 raised this subspecies to the species level at the time of its transfer to *"Plethysyrinx"* which is a *jr syn.* of *Cyclapophysis.* We herein reject the emendation of this species by Sarjeant, *op.cit.* because the described "trabeculae" appear to be debris on the specimen.

"?lemniscatum" (Corradini, 1973). NOW *Cyclapophysis.* Stover and Evitt, 1978, p.147 considered this to be a "provisionally accepted species" of *Cordosphaeridium.*

"majus" (Lejeune-Carpentier, 1940) Corradini, 1973, p.149. NOW *Amphorosphaeridium.* Originally *Hystrichosphaeridium;* subsequently *?Polysphaeridium.* See also *?Dapsilidinium.* The transfer of this species from *?Polysphaeridium* to *Cordosphaeridium* was rejected by Stover and Evitt, 1978, p.76.

***CORDOSPHAERIDIUM* (cont'd)**

"microtriainum" (Klumpp, 1953) Eisenack 1963b, p.263. NOW *Operculodinium;* formerly *Hystrichosphaeridium*. Stover and Evitt, 1978, p.147 considered this to be a "problematical species" of *Cordosphaeridium*. The transfer of this species to *Polysphaeridium* by Kar, 1979, p.33 was rejected by Lentin and Williams, 1981, p.231.

subsp. *"centrocarpum"* (Deflandre and Cookson, 1955) De Coninck, 1969, p.32. Lentin and Williams, 1973, p.33 rejected this interpretation by De Coninck and retained the species *centrocarpum* as the type of the genus *Operculodinium*.

subsp. *"nanum"* (Rozen, 1965) Lentin and Williams, 1973, p.33. NOW *?Cleistosphaeridium nanum;* formerly *Cordosphaeridium microtriainum* var. *nanum*.

minimum (Morgenroth, 1966a, p.24, pl.5, fig.6-7) Benedek, 1972, p.25-26. Early Eocene; formerly *Cordosphaeridium inodes* subsp. *minimum*.

minus (Morgenroth, 1966a, p.24, pl.5, fig.4-5) Islam, 1983b, p.38. Early Eocene; formerly *Cordosphaeridium inodes* subsp. *minus*.

"multispinosum" (Davey and Williams, 1966b). NOW *?Amphorosphaeridium*.

"palmatum" (White, 1842) De Coninck, 1965, p.32. NOW *Hystrichosphaeridium*.

robustum (Gocht, 1969, p.42, pl.2, fig.1-2) Sarjeant, 1981, p.105. Eocene; formerly *Cordosphaeridium inodes* subsp. *robustum*. The elevation of this form to the species level is not attributable to Islam, 1983a, p.235. The emendation of this species by Sarjeant, 1981, p.105-106 is herein rejected because his illustration (pl.2, fig.1) clearly indicates cingular processes.

senegalense Jain and Millepied, 1975, p.149, pl.5, fig.68. Campanian-Maastrichtian. The provisional transfer of this species to *Tityrosphaeridium* by Sarjeant, 1981, p.121 is herein rejected for the reasons under *Cordosphaeridium*.

?simplex Michael, 1964, p.32-33, pl.3, fig.4. Early Barremian. Stover and Evitt, 1978, p.147 considered this to be a "provisionally accepted species".

"solaster" (Morgenroth, 1966a). NOW *?Exochosphaeridium*.

?tenuistriatum Heisecke, 1970, p.245, pl.7, fig.1; pl.12, fig.3-4. Early Paleocene. Stover and Evitt, 1978, p.147 considered this to be a "provisionally accepted species". The provisional transfer of this species to *Tityrosphaeridium* by Sarjeant, 1981, p.120-121 is herein rejected for the reasons given under *Cordosphaeridium*.

"tiara" (Klumpp, 1953) Morgenroth, 1966a, p.25. NOW *Operculodinium*.

CORDOSPHAERIDIUM "tiara" **(cont'd)**

subsp. *"centrocarpum"* (Deflandre and Cookson, 1955) Morgenroth, 1966a, p.26. NOW *Operculodinium centrocarpum.*

?trompetum (Cookson and Eisenack, 1982) *comb. nov.* 1982 *Polysphaeridium trompetum* Cookson and Eisenack, p.47, pl.4, fig.22. Paleocene. We herein questionably include this species in *Cordosphaeridium.*

"truncigerum" (Deflandre, 1937b) De Coninck, 1975, p.80. NOW *Pervosphaeridium.* Originally *Hystrichosphaeridium;* subsequently *?Litosphaeridium.* The transfer of this species to *Exochosphaeridium* by Davey, 1978, p.894 was rejected by Lentin and Williams, 1981, p.58.

"uncinispinosum" (De Coninck, 1969). NOW *Operculodinium.* Stover and Evitt, 1978, p.147 considered this to be a problematic species.

"valiantum" (Sah *et al.*, 1970, p.145, pl.1, fig.8-9) Stover and Evitt, 1978, p.147. Late Cretaceous; formerly *Achomosphaera.* We reject the contention of Sarjeant, 1981, p.124 that this species should be returned to *Achomosphaera* and accept the opinion of Jain, 1982, p.52 that it is a *jr syn.* of *Cordosphaeridium exilimurum.*

varians May, 1980, p.47-48, pl.2, fig.4,7-8; pl.14, fig.1-3; pl.15, fig.2a-b 3a-d; pl.16, fig.6a-10b. Campanian-Maastrichtian.

"xanthium" (Benedek, 1972). NOW *Lingulodinium.*

CORNUDINIUM Pocock, 1972, p.93.

**stavelyense* Pocock, 1972, p.94, pl.24, fig.15-16. Late Bajocian.

CORONIFERA Cookson and Eisenack, 1958, p.45; emend. Davey, 1974, p.47; emend. May, 1980. p.48.

albertii Millioud, 1969, p.425-426, pl.1, fig.4. Late Hauterivian.

caperata Jiabo, 1978, p.65, pl.23, fig.18; text-fig.10. Early Tertiary.

"kaiseri" Ashraf, 1979, p.139-140, pl.8, fig.7-8. Early Cretaceous. Below, 1982c, p.9 considered this species to be a *jr syn.* of *Florentinia radiculata.*

"monstruosa" (Tasch, 1964, p.195, pl.1, fig.12) Stover and Evitt, 1978, p.148. Albian. Originally *Hystrichosphaeridium;* subsequently *?Diphyes.* Below, 1982c, p.5 considered this species to be a *jr syn.* of *Coronifera oceanica.*

**oceanica* Cookson and Eisenack, 1958, p.45, pl.12, fig.6; emend. May, 1980, p.48-49. Albian.

CORONIFERA oceanica (cont'd)

subsp. *hebospina* Yun, 1981, p.23-24, pl.12, fig.2,4,6; text-fig.6b. Early Santonian.

subsp. *magna* (W. Wetzel, 1955, p.35,38, fig.9-10,14) Sarjeant, 1984c, p.138-139. At the time of the transfer, Sarjeant, 1984c, p.138-139, pl.2, fig. 6; pl.5, fig.4-5; text-fig.11 emended the diagnosis. Paleocene. Originally *Hystrichosphaeridium pseudhystrichodinium* subsp. *magnum;* subsequently *Baltisphaeridium pseudhystrichodinium* subsp. *magnum.* This subspecies was missed in all previous editions of Lentin and Williams (1973,1977b,1981).

ovata Jiabo, 1978, p.66, pl.23, fig.19. Early Tertiary.

striolata (Deflandre, 1937b, p.72, pl.15, fig.1-2) Stover and Evitt, 1978, p.148. Late Cretaceous. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium;* then *Exochosphaeridium.* See also *Exochosphaeridium truncatum.*

subsp. *?minor* (O. Wetzel, 1933b, p.45-46, pl.4, fig.26) Sarjeant, 1984c, p.32. Late Cretaceous. Originally *Hystrichosphaera hirsuta* forma *minor;* subsequently *Operculodinium hirsutum* subsp. *minor.* At the time of the transfer, Sarjeant, *op.cit.* stated that this generic reattribution was "emphatically provisional".

subsp. *?varians* (O. Wetzel, 1933b, p.47-48, pl.4, fig.27-29) Sarjeant, 1984c, p.32. Late Cretaceous. Originally *Hystrichosphaera hirsuta* forma *varians;* subsequently *Operculodinium hirsutum* subsp. *varians.* At the time of the transfer, Sarjeant, *op.cit.* stated that this generic reattribution was "emphatically provisional".

?tubulosa Cookson and Eisenack, 1974, p.73, pl.28, fig.12. Paleocene. O.C. Stover and Evitt, 1978, p.148 considered this to be a "provisionally accepted species".

CORRUDINIUM Stover and Evitt, 1978, p.148-149.

cristatum Châteauneuf, 1980, p.136, pl.21, fig.3-4,6. Late Eocene (Auversian).

harlandii Matsuoka, 1983b, p.117-118, pl.4, fig.5-7; text-fig.11. Pliocene or younger.

**incompositum* (Drugg, 1970b, p.810-811, fig.1E-O,2A) Stover and Evitt, 1978, p.149. Oligocene. Originally *Gonyaulacysta;* subsequently *Leptodinium.*

CRASPEDODINIUM Cookson and Eisenack, 1974, p.75. Lentin and Williams, 1976, p.157 considered this genus to be a *jr syn.* of *Ovoidinium.* Stover and Evitt, 1978, p.34 refuted this on the basis of the archeopyle, the shape of the pericyst, and the relationship of the endocyst to the pericyst.

CRASPEDODINIUM **(cont'd)**

americanum (Habib, 1970, p.372, pl.10, fig.10) Stover and Evitt, 1978, p.34. Albian-Cenomanian; formerly *Xenikoon*.

"*defloccatum*" (Davey and Verdier, 1973) Mehrotra and Sarjeant, 1984c, p.49-50. The above transfer by Mehrotra and Sarjeant, *op.cit.* is herein rejected and the species is retained in *Leberidocysta*.

**indistinctum* Cookson and Eisenack, 1974, p.76, pl.25, fig.6-8. Aptian-Albian; see also *?Ovoidinium*.

"*pergamentaceum*" (Burger, 1980a) Mehrotra and Sarjeant, 1984c, p.50. The above transfer by Mehrotra and Sarjeant, *op.cit.* is herein rejected and the species is retained in *?Leberidocysta*.

CRIBROPERIDINIUM Neale and Sarjeant, 1962, p.443; emend. Davey, 1969a, p.125; emend. Sarjeant, 1982, p.40; emend. Helenes, 1984, p.112. See also *Millioudodinium* which is a *jr syn.* of this genus.

aichmetes (Sarjeant, 1966b, p.123-124, pl.13, fig.5-6; text-fig.30) Helenes, 1984, p.118. Late Barremian. Originally *Gonyaulacysta;* subsequently *Millioudodinium*.

"*apione*" (Cookson and Eisenack, 1958, p.36, pl.3, fig.7; text-fig.3-4) Morgan, 1980, p.20. Albian. Originally *Gonyaulax;* subsequently *Gonyaulacysta,* then *Millioudodinium*. Burger, 1980a, p.82 and Yun, 1981, p.8 considered this species to be a *jr syn.* of *Cribroperidinium edwardsii* (Cookson and Eisenack, 1958) Davey, 1969a. We concur with this opinion.

auctificum (Brideaux, 1971, p.82-83, pl.23, fig.40-41; text-fig.9a-b) Stover and Evitt, 1978, p.150. Late Albian; formerly *Gonyaulacysta*.

?birkelundii (Fensome, 1979, p.38-40, pl.5, fig.5,8,11; text-fig.14) Helenes, 1984, p.126. Portlandian. Originally *Gonyaulacysta;* subsequently *Millioudodinium*. At the time of the transfer, Helenes, *op.cit.* considered this to be a "provisionally assigned species".

boreas (Davey, 1974, p.52-53, pl.4, fig.1-4; pl.7, fig.5) Helenes, 1984, p.121. Late Barremian. Originally *Gonyaulacysta;* subsequently *?Millioudodinium*.

cauda (Gitmez and Sarjeant, 1972, p.193-194, pl.2, fig.1-2,4-5) Helenes, 1984, p.124. Kimmeridgian. Originally *Gonyaulacysta;* subsequently *Millioudodinium,* then *Rhynchodiniopsis*. At the time of the transfer, Helenes, 1984, p.124 considered this a "problematical species". N.I.A.

"*comptum*" (Duxbury, 1980) Lentin and Williams, 1981, p.59. NOW *Apteodinium;* formerly *Gonyaulacysta*. See also *Acanthaulax*.

***CRIBROPERIDINIUM* (cont'd)**

?confossum (Duxbury, 1977, p.33, pl.2, fig.2-4) Helenes, 1984, p.128. Hauterivian. Originally *Gonyaulacysta;* subsequently *Millioudodinium*. At the time of the transfer, Helenes, *op.cit.* considered this to be a "provisionally assigned species".

conjunctum (Eisenack and Cookson, 1960, p.5, pl.1, fig.7-8) Helenes, 1984, p.121. Aptian; formerly *Apteodinium*.

conopium Duxbury, 1983, p.43, pl.4, fig.11. Early Albian.

cooksoniae Norvick, 1976, p.36-37, pl.1, fig.1-3; text-fig.13. Cenomanian. O.C.

?cornutum Davey, 1974, p.48-49, pl.2, fig.1-5. Middle-Late Barremian. Lentin and Williams, 1981, p.59 rejected the transfer of this species to the genus *Occisucysta* Gitmez by Below, 1981a, p.60. Helenes, 1984, p.128 considered this to be a "provisionally assigned species".

"crispum" (W. Wetzel, 1967) Fenton, 1981, p.255. NOW *Acanthaulax*. The transfer of this species to *Cribroperidinium* was rejected by Lentin and Williams, 1981, p.59, who retained the species in *Hystrichogonyaulax*.

cristatum (Riley *in* Fisher and Riley) *comb. nov.*
1980 *Leptodinium cristatum* Riley *in* Fisher and Riley, p.320, pl.1, fig.8,12. Volgian. See also *Leptodinium volgense*.

diaphane (Cookson and Eisenack, 1958, p.36, pl.3, fig.13-14; text-fig.10-11) Stover and Evitt, 1978, p.150. Aptian. Originally *Gonyaulax;* subsequently *Gonyaulacysta*.

edwardsii (Cookson and Eisenack, 1958, p.32, pl.3, fig.5-6; text-fig.7) Davey, 1969a, p.128. Albian-Early Turonian. Originally *Gonyaulax;* subsequently *Gonyaulacysta*. Helenes, 1984, p.125 considered this to be a "problematic species". See also *Cribroperidinium apione* which is a *jr syn.* of this species.

ehrenbergii (Gitmez, 1970, p.252-254, pl.2, fig.8-9; text-fig.8) Helenes, 1984, p.124. Early Kimmerdigian. Originally *Gonyaulacysta;* subsequently *Millioudodinium*. Helenes, *op.cit.* considered this to be a "problematic species".

exilicristatum (Davey, 1969a, p.121, pl.1, fig.1-2; text-fig.9A-B) Stover and Evitt, 1978, p.150. Cenomanian; formerly *Gonyaulacysta*.

fetchamense (Sarjeant, 1966b, p.128-130, pl.15, fig.1-2; text-fig.33) Helenes, 1984, p.121. Cenomanian. Originally *Gonyaulacysta;* subsequently *Millioudodinium*.

?forulatum (Yu Jingxian, 1982) *comb. nov.*
1982 *Gonyaulacysta forulata* Yu Jingxian, p.241, pl.2, fig.3-4,6-8. Late Jurassic-Early Cretaceous. We herein regard this as a provisionally accepted species of *?Cribroperidinium*.

?gigas (Raynaud, 1978, p.392-393, pl.2, fig.16) Helenes, 1984, p.128. Late Kimmeridgian-Portlandian. Originally *Gonyaulacysta;* subsequently *Millioudodinium*. At the time of the transfer, Helenes, *op.cit.* considered this to be a "provisionally assigned species".

giuseppei (Morgenroth, 1966a, p.5, pl.2, fig.3-6) Helenes, 1984, p.121. Early Eocene. Originally *Gonyaulax;* subsequently *Gonyaulacysta,* then *?Millioudodinium,* then *?Rhynchodiniopsis*. Helenes, 1984, p.121 placed the subspecies, *C. guiseppei* subsp. *major* in synonymy with the species.

subsp. *"major"* (Morgenroth, 1966a, p.6, pl.2, fig.5-6). See *C. guiseppei*.

globatum (Gitmez and Sarjeant, 1972, p.195-197, pl.3, fig.1-2; text-fig.5A-B) Helenes, 1984, p.124. Middle-Late Kimmeridgian. Originally *Gonyaulacysta;* subsequently *Millioudodinium,* then *Rhynchodiniopsis*. Helenes *op. cit.* considered this to be a "problematic species".

?globosum (Brideaux, 1971, p.81, pl.23, fig.37-38; text-fig.7g-h) Helenes, 1984, p.128. Middle-Late Albian. Originally *Gonyaulacysta;* subsequently *?Millioudodinium*. At the time of the transfer, Helenes, *op.cit.* considered this to be a "provisionally assigned species".

?granomembranaceum (Matsuoka, 1983b) *comb. nov.*
1983b *Millioudodinium granomembranaceum* Matsuoka, p.121-122, pl.1, fig.1-5; text-fig.14. Early-early Middle Miocene. Pending further study of the holotype, we provisionally include this species in *Cribroperidinium*.

"granulatum" (Klement, 1960) Stover and Evitt, 1978, p.150. NOW *Meristaulax*. Originally *Gonyaulax;* subsequently *Gonyaulacysta*. See also *Rhynchodiniopsis*.

granuligerum (Klement, 1960, p.41, pl.5, fig.4-5) Stover and Evitt, 1978, p.150. Middle Oxfordian-Early Kimmeridgian. Originally *Gonyaulax;* subsequently *Gonyaulacysta*. See also *Cryptarchaeodinium* and *Rhynchodiniopsis*. If this species is a *jr syn.* of *Cribroperidinium* (now *Meristaulax) granulatum* (Klement) Stover and Evitt - as stated by Fisher and Riley, 1980, p.321 - its transfer to *Cribroperidinium* by Stover and Evitt, *op.cit.* was unnecessary. However, Sarjeant, 1984a, p.156-158 has demonstrated that *C. granuligerum* is a distinct and separate species. Sarjeant, *op.cit.*, text-fig.1 illustrated the holotype of *C. granuligerum*. This has the typical *Cribroperidinium* tabulation. We reject Sarjeant's transfer of this species to *Cryptarchaeodinium,* because we do not agree with his interpretation of seven postcingulars. We also cannot accept the proposed emendation (Sarjeant, 1984a, p.157).

CRIBROPERIDINIUM (cont'd)

intricatum Davey, 1969a, p.125-128, pl.2, fig.1-3; text-fig.11-12. Albian. Helenes, 1984, p.125 considered this to be a "problematic species".

janinae Gorka, 1982, p.106,108,110, text-fig.A-D, pl.1-2. Early Hauterivian.

jubaris (Davies, 1983) *comb. nov.*
1983 *Millioudodinium jubaris* Davies, p.19, pl.5, fig.13-20; text-fig.13. Tithonian. N.I.A.

?longicorne (Downie, 1957) *comb. nov.*
1957 *Gonyaulax longicornis* Downie, p.420, pl.20, fig.8. Late Kimmeridgian. Also formerly *?Gonyaulacysta*, then *Millioudodinium*. Because of uncertainty as to the tabulation mode, we consider the present generic assignment provisional.

muderongense (Cookson and Eisenack, 1958, p.32, pl.3, fig.3-4) Davey, 1969a, p.128. Aptian. Originally *Gonyaulax;* subsequently *Gonyaulacysta.* Helenes, 1984, p.125 considered this to be a "problematic species".

?obesum (Brideaux, 1971, p.82, pl.23, fig.39; text-fig.8a-b) Helenes, 1984, p.130. Late Albian. Originally *Gonyaulacysta;* subsequently *Millioudodinium,* then *Rhynchodiniopsis.* At the time of the transfer, Helenes, *op.cit.* considered this to be a "provisionally assigned species".

orthoceras (Eisenack, 1958, p.388, pl.21, fig.3-11; pl.24, fig.1) Davey, 1969a, p.128-129. Aptian. Originally *Gonyaulax;* subsequently *Gonyaulacysta.* Davey and Verdier, 1971, p.17 considered *Cribroperidinium orthoceras* to be a *jr syn.* of *Cribroperidinium edwardsii* (Cookson and Eisenack) Davey. However, they did not give a correct citation. Stover and Evitt, 1978, p.150 concurred with this opinion. Ch. Singh, 1971, p.307 and Dodekova, 1971, p.8 included *C. orthoceras* in *Gonyaulacysta.* Lentin and Williams, 1973, p.35 rejected the above transfers on the basis of the morphology of *C. orthoceras* which conforms to that of the genus *Cribroperidinium.* Lentin and Williams, 1981, p.60 rejected the contention of Below, 1981a, p.39-40 that *C. orthoceras is not a jr syn.* of *C. edwardsii.* Helenes, 1984, p.125 agreed with Below, *op.cit.* and considered this to be a "problematic species".

palla (Sarjeant, 1966b, p.113-114, pl.13, fig.3-4; text-fig.24) Helenes, 1984, p.124. Early Barremian. Originally *Gonyaulacysta;* subsequently *Millioudodinium* and *Rhynchodiniopsis.* N.I.A.

?pannonicum (Nagy, 1965, p.200-201, pl.1, fig.1-2; pl.2, fig.10; text-fig.1-2) Helenes, 1984, p.130. Early Pliocene. Originally *Gonyaulax;* subsequently *Gonyaulacysta,* then *?Millioudodinium.* At the time of the transfer, Helenes, *op.cit.* considered this to be a "provisionally assigned species".

***CRIBROPERIDINIUM* (cont'd)**

?parorthoceras (Davey, 1968, p.1) Helenes, 1984, p.130. Holotype figured by Sarjeant, 1966b as *Gonyaulacysta orthoceras*, pl.14, fig.5-6; text-fig.29. Late Barremian. Originally *Gonyaulacysta;* subsequently *Millioudodinium*. At the time of the transfer, Helenes, 1984 considered this to be a "provisionally assigned species".

?perforans (Cookson and Eisenack, 1958, p.30-32, pl.2, fig.1-4,7-8; text-fig.8-9) Morgan, 1980, p.21. Late Jurassic. Originally *Gonyaylax*, subsequently *Gonyaulacysta*, then *?Leptodinium*. See also *Rhynchodiniopsis*. Helenes, 1984, p.130 considered this to be a "provisionally assigned species".

?pyrum (Drugg, 1967, p.14, pl.1, fig.17; pl.9, fig.6a-b) Stover and Evitt, 1978, p.150. Maastrichtian-Danian. Originally *Gonyaulax;* subsequently *Gonyaulacysta*. Stover and Evitt, 1978, p.150 considered this to be a "provisionally accepted species".

?saetigerum (McIntyre and Brideaux, 1980, p.15, pl.3, fig.2-3,7) Helenes, 1984, p.130. Valanginian; formerly *Millioudodinium*. At the time of the transfer, Helenes, *op.cit.* considered this to be a "provisionally assigned species".

?sarjeantii (Vozzhennikova, 1967, p.87-89, pl.25, fig.1-2; pl.28, fig.4; pl.31, fig.1-3; pl.32, fig.1-4) Helenes, 1984, p.130. Tithonian. Originally *Gonyaulax;* subsequently *Gonyaulacysta*, then *Millioudodinium*, then *Rhynchodiniopsis*. At the time of the transfer, Helenes, *op.cit.* considered this to be a "provisionally assigned species".

subsp. *sphaericum* (Vozzhennikova, 1967) *comb. nov.*
1967 *Gonyaulax sarjeanti* var. *sphaericum* Vozzhennikova, p.89, pl. 25, fig.1-2; pl.28, fig.4; pl.32, fig.1-4. Tithonian; also formerly *Gonyaulacysta sarjeantii* subsp. *sphaerica*, then *Millioudodinium sarjeantii* subsp. *sphaericum*, then *Rhynchodiniopsis sarjeantii* subsp. *sphaerica*.

?scottii (Cookson and Eisenack, 1958, p.30, pl.2, fig.5-6) Helenes, 1984, p.131. Early-Middle Kimmeridgian. Originally *Gonyaulax;* subsequently *Gonyaulacysta*, then *?Millioudodinium*. At the time of the transfer, Helenes, *op.cit.* considered this to be a "provisionally assigned species".

**sepimentum* Neale and Sarjeant, 1962, p.443, pl.19, fig.4; text-fig.3. Hauterivian.

?strigosum (Yu Jingxian, 1982) *comb. nov.*
1982 *Gonyaulacysta strigosa* Yu Jingxian, p.240-241, pl.2, fig.1-2; pl.3, fig.3.. Late Jurassic-Early Cretaceous. We herein regard this as a provisionally accepted species of *?Cribroperidinium*.

***CRIBROPERIDINIUM* (cont'd)**

systremmatum (Gitmez and Sarjeant, 1972, p.204-205, pl.5, fig.7-8) Stover and Evitt, 1978, p.150. Early Kimmeridgian; formerly *Gonyaulacysta*. See also *Millioudodinium*. Helenes, 1984, p.125 considered this to be a "problematic species".

tensiftense Below, 1981a, p.41-42, pl.1, fig.10-11; pl.13, fig.3-5; text-fig.24. Barremian-Albian.

tenuitabulatum (Gerlach, 1961, p.159, pl.25, fig.10-11; text-fig.1-3) Helenes, 1984, p.124. Middle Oligocene-Middle Miocene. Originally *Gonyaulax;* subsequently *Gonyaulacysta,* then *Millioudodinium*. See also *Rhynchodiniopsis*. We do not accept the transfer to *Rhynchodiniopsis* by Sarjeant, 1984b, p.76,78,82, since the morphology of this species accords with that of *Cribroperidinium*. Sarjeant, *op.cit.* could not examine the holotype since it is lost; he accordingly designated a lectotype (pl.2, fig.3).

ventriosum (O. Wetzel, 1933a, p.161-162, pl.2, fig.4-6; text-fig.1,8) Lentin and Williams, 1973, p.35; emend. Lejeune-Carpentier and Sarjeant, 1981, p.5. Senonian. Originally *Peridinium;* subsequently *Palaeoperidinium*.

wetzelii (Lejeune-Carpentier, 1939, p.B526; text-fig.1-2; emend. Lejeune-Carpentier, 1946, p.B189-190; emend. Lejeune-Carpentier and Sarjeant, 1981, p.2-3) Helenes, 1984, p.124. Senonian. Originally *Gonyaulax;* subsequently *?Gonyaulacysta*.

CRUSSOLIA Wolfard and Van Erve, 1981, p.323-325.

**deflandrei* Wolfard and Van Erve, 1981, p.325-328, pl.1, fig.1-2; pl.2, fig.1-4. Callovian-Early Oxfordian.

CRYPTARCHAEODINIUM Deflandre, 1939, p.145; emend. Gitmez, 1970, p.246; emend. Stover and Evitt, 1978, p.228; emend. Sarjeant, 1984c, p.155-156. We herein reject the emendation by Sarjeant, *op.cit.*, since we agree with Stover and Evitt, 1978, p.228 that the holotype of *C. calcaratum* has six postcingulars only.

**calcaratum* Deflandre, 1939, p.145, pl.6, fig.6; emend. Gitmez, 1970, p.246-248. Kimmeridgian.

"granuligerum" (Klement, 1960) Sarjeant, 1984a, p.156. NOW *Cribroperidinium*. Originally *Gonyaulax;* subsequently *Gonyaulacysta*. See also *Rhynchodiniopsis*. For the reasons given under *Cribroperidinium granuligerum,* we cannot accept the transfer of this species to *Cryptarchaeodinium,* or its emendation by Sarjeant, *op.cit.*, p.156-158.

CTENIDODINIUM Deflandre, 1938b, p.181; emend. Sarjeant, 1966b, p.154; emend. Sarjeant, 1975a, p.55; emend. Woollam, 1983, p.190. See also *Brotzenia* which is a *jr syn.* of this genus.

"*adelos*" (Fenton *et al.*, 1980) Lentin and Williams, 1981, p.61. NOW *Bradleyella;* formerly *Dichadogonyaulax*. O.C.

?chondrum Drugg, 1978, p.66, pl.1, fig.8-11. Early Kimmeridgian. Woollam, 1983, p.193 considered this to be a provisionally accepted species.

combazii Dupin, 1968, p.2, pl.1, fig.1-6. Middle-Late Bathonian. Woollam, 1983, p.193 suggested that this species may be conspecific with *Hystrichogonyaulax cornigera* (Valensi) Sarjeant.

continuum Gocht, 1970b, p.141-142, pl.26, fig.3; pl.27, fig.5; pl.29, fig.1-2; pl.32, fig.15; pl.33, fig.8. Early Bathonian.

"*?cristatum*" (Horowitz, 1975, p.25, pl.1, fig.8) Stover and Evitt, 1978, p.204. Late Triassic. Formerly *Brotzenia*. See also *Dichadogonyaulax*. Stover and Evitt, 1978, p.204 considered this to be a "provisionally accepted species" of *Ctenidodinium*. *Jr syn.* of *Ctenidodinium ornatum* according to Woollam, 1983, p.190.

"*culmulum*" (Norris, 1965) Lentin and Williams, 1973, p.35. NOW and formerly *Dichadogonyaulax*. Originally *Gonyaulax*. The transfer of this species from *Dichadogonyaulax* to *Ctenidodinium* was rejected by Sarjeant, 1975a, p.50-51. Stover and Evitt, 1978, p.204, however, concurred with Lentin and Williams, 1973, p.35. Woollam, 1983, p.193 redefined *Dichadogonyaulax* and retained *D. culmula* as the type of the genus.

elegantulum Millioud, 1969, p.427, pl.2, fig.1-3; emend. Below, 1981a, p.42. Late Hauterivian-Barremian.

"*gochtii*" (Sarjeant, 1976a) Stover and Evitt, 1978, p.204. NOW *Korystocysta;* formerly *Dichadogonyaulax*.

"*kettonense*" (Sarjeant, 1976a) Stover and Evitt, 1978, p.204. NOW *Korystocysta;* formerly *Dichadogonyaulax*.

mosaicum Dodekova, 1975, p.18-19, pl.1, fig.1-6; pl.2, fig.1-3,6. Late Bathonian.

"*norrisii*" (Pocock, 1972) Stover and Evitt, 1978, p.204. NOW *Korystocysta*. Originally *Leptodinium;* subsequently *Dichadogonyaulax*.

**ornatum* (Eisenack, 1935, p.176, pl.4, fig.9-10) Deflandre, 1938b, p.181. Oxfordian; formerly *Lithodinia jurassica* var. *ornata*. Lentin and Williams, 1973, p.35 rejected the transfer of this species to *Gonyaulacysta* by Pocock, 1972, p.87-88. *Ctenidodinium ornatum* has an epicystal archeopyle (combination $\overline{\text{AP}}$), whereas *Gonyaulacysta* has a simple precingular archeopyle. See also *?Ctenidodinium cristatum* which is a *jr syn.* of this species.

***CTENIDODINIUM* (cont'd)**

"?pachydermum" (Deflandre, 1938b) Gocht, 1970b, p.142-143. NOW *Korystocysta.* Originally *Gonyaulax;* subsequently *Gonyaulacysta.* Stover and Evitt, 1978, p.204 considered this to be a "provisionally accepted species" of *Ctenidodinium.*

panneum (Norris, 1965, p.796-798, fig.3,10-13) Lentin and Williams, 1973, p.36. Kimmeridgian-Portlandian. Originally *Leptodinium;* subsequently *Dichadogonyaulax.* The transfer of this species from *Dichadogonyaulax* to *Ctenidodinium* was rejected by Sarjeant, 1975a, p.55. Stover and Evitt, 1978, p.204, however, concurred with Lentin and Williams, 1973, p.36.

"rotundum" (Dodekova, 1975). NOW *Dichadogonyaulax.*

"schizoblatum" (Norris, 1965) Lentin and Williams, 1973, p.36. NOW and formerly *Dichadogonyaulax.* Originally *Leptodinium.* The transfer of this species from *Dichadogonyaulax* to *Ctenidodinium* was rejected by Sarjeant, 1975a, p.55. Stover and Evitt, 1978, p.204, however, concurred with Lentin and Williams, 1973, p.36. Woollam, 1983, p.193 redefined *Dichadogonyaulax* and retained *D. schizoblatum* in that genus.

scissum McIntyre and Brideaux, 1980, p.21, pl.8, fig.6-9; pl.9, fig.1-6. Valanginian.

"sellwoodii" (Sarjeant, 1975a) Stover and Evitt, 1978, p.204. NOW and formerly *Dichadogonyaulax.* Woollam, 1980, p.250 stated that this species may be conspecific with *Ctenidodinium stauromatos* (Sarjeant) Stover and Evitt and *Ctenidodinium tenellum* Deflandre.

"stauromatos" (Sarjeant, 1976) Stover and Evitt, 1978, p.204. NOW and formerly *Dichadogonyaulax.* Riley and Fenton, 1982, p.199 considered *Ctenidodinium stauromatos* (as *Dichadogonyaulax stauromatos)* to be a *jr syn.* of *Ctenidodinium sellwoodii* (as *Dichadogonyaulax sellwoodii.)* Woollam, 1980, p.250 stated that this species may be conspecific with *Ctenidodinium sellwoodii* (Sarjeant) Stover and Evitt and *Ctenidodinium tenellum* Deflandre.

tenellum Deflandre, 1938b, p.182, pl.9, fig.9-10. Oxfordian. Woollam, 1980, p.250 stated that this species may be conspecific with *Ctenidodinium sellwoodii* (Sarjeant) Stover and Evitt and *Ctenidodinium stauromatos* (Sarjeant) Stover and Evitt.

"CUBICULOSPHAERA" Harris, 1974, p.163-164. *Jr syn.* of *Geiselodinium* according to Stover and Evitt, 1978, p.230-231. These authors transferred the type and single species of the genus, *Cubiculosphaera maslinensis,* to *Geiselodinium.*

CUPRITIA Courtinat *in* Courtinat and Gaillard, 1980, p.23.

**minima* Courtinat *in* Courtinat and Gaillard, 1980, p.23-24, pl.2, fig.7,10; text-fig.3. Late Oxfordian. Courtinat does not now consider this species to be a dinoflagellate (pers. comm. to J. Jansonius).

CYCLAPOPHYSIS Benson, 1976, p.182.

lemniscata (Corradini, 1973) *comb. nov.*
1973 *?Cordosphaeridium lemniscatum* Corradini, p.152-153, pl.22, fig.4a-b,5; pl.33, fig.2,4; pl.39, fig.2. Late Cretaceous-Paleocene. We herein reject the transfer of this species to *Plethysyrinx* by Sarjeant, 1981, p.106 since that genus is considered to be a *jr syn.* of *Cyclapophysis*.

**monmouthensis* Benson, 1976, p.183, pl.1, fig.9-12; pl.2, fig.1. Late Maastrichtian-Early Paleocene.

CYCLODICTYON Cookson and Eisenack, 1958, p.58.

minor Pocock, 1972, p.101, pl.23, fig.10. Callovian. According to J. Jansonius (pers. comm.), this is possibly an acritarch.

**paradoxum* Cookson and Eisenack, 1958, p.58-59, pl.12, fig.1-2. Cenomanian-Early Turonian.

CYCLONEPHELIUM Deflandre and Cookson, 1955, p.285; emend. Williams and Downie, 1966c, p.223; emend. Ioannides, *et al.*, 1976, p.450; emend. Sarjeant and Stover, 1978, p.51; emend. Stover and Evitt, 1978, p.35. The emendation of Dörhöfer and Davies, 1980, p.41 was rejected by Lentin and Williams, 1981, p.63.

"*areolatum*" (Cookson and Eisenack, 1960b). NOW *Yalkalpodinium*.

asperum (Ch. Singh, 1971, p.322, pl.50, fig.1) Below, 1981a, p.10. Middle Albian; formerly *?Canningia*. We do not agree with Morgan, 1980, p.23 that *the genus Epelidosphaeridia* is characterized by "an even cover of short spines". Accordingly, we herein reject the transfer of this species to *Epelidosphaeridia* Davey by Morgan, *op.cit.*

"*?assamicum*" (Jain *et al.*, 1975). NOW *Glaphyrocysta*. Stover and Evitt, 1978, p.36 considered this to be a "provisionally accepted species" of *Cyclonephelium*.

asymmetricum Burger, 1980b, p.270, fig.6c,7a-c. Neocomian.

"*?attadalicum*" (Cookson and Eisenack, 1962b). NOW *Canningia*. Cookson and Eisenack, *op.cit.*, p.495 questionably included this species in *Cyclonephelium*. The retention of this genus in *?Cyclonephelium* by Sarjeant and Stover, 1978, p.52 was rejected by Lentin and Williams, 1981, p.63.

***CYCLONEPHELIUM* (cont'd)**

?barbiferum Cookson and Eisenack, 1982, p.42, pl.7, fig.8-9. Albian-Cenomanian. Cookson and Eisenack, *op.cit.* questionably included this species in *Cyclonephelium*.

brevispinatum (Millioud, 1969, p.427-428, pl.1, fig.8-9) Below, 1981a, p.11. Late Hauterivian-Early Aptian. Originally *Cyclonephelium distinctum* var. *brevispinatum;* subsequently *Cyclonephelium distinctum* subsp. *brevispinatum.*

brevispinosum (Pocock, 1962, p.81, pl.14, fig.222-223; emend. Brideaux, 1977, p.15-16) Lentin and Williams, 1981, p.63. This species was emended by Brideaux, 1977, p.15-16 when he transferred it to *Tenua.* Barremian. Originally *Palaeohystrichophora;* subsequently *Tenua,* then *?Canningia.*

castelcasiense Corradini, 1973, p.161, pl.24, fig.2,5a-b; pl.35, fig.1-2. Late Cretaceous-Paleocene.

chabaca Below, 1981a, p.12-13, pl.4, fig.9-11; pl.9, fig.2-3; pl.15, fig.25. Aptian-Cenomanian.

clathromarginatum Cookson and Eisenack, 1962b, p.495, pl.6, fig.1-4. Late Albian-Cenomanian.

"*combinatum*" (Jiabo, 1978). NOW *Glaphyrocysta.*

**compactum* Deflandre and Cookson, 1955, p.285, pl.2, fig.11-13; text-fig.44-46. Albian-Santonian.

crassimarginatum Cookson and Eisenack, 1974, p.74-75, pl.28, fig.1-4. Middle Cretaceous.

deconinckii Boltenhagen, 1977, p.52-53, pl.4, fig.5-6. Campanian.

densebarbatum Cookson and Eisenack, 1960b, p.253, pl.38, fig.10. Tithonian.

distinctum Deflandre and Cookson, 1955, p.285-286, pl.2, fig.14; text-fig.47-48. Senonian.

subsp. "*brevispinatum*" (Millioud, 1969) Lentin and Williams, 1973, p.36. NOW *Cyclonephelium brevispinatum;* formerly *Cyclonephelium distinctum* var. *brevispinatum.*

subsp. *distinctum* Deflandre and Cookson, 1955, p.285-286, pl.2, fig.14; text-fig.47-48. Senonian.

subsp. *longispinatum* Davey, 1978, p.894, pl.3, fig.4,7-8. Turonian.

CYCLONEPHELIUM distinctum **(cont'd)**

subsp. *psilatum* (Yu Jingxian and Zhang Wangping, 1980) *stat. nov.* 1980 *Cyclonephelium distinctum* var. *psilatum* Yu Jingxian and Zhang Wangping, p.115, pl.4, fig.1-2. Turonian-Santonian.

"*divaricatum*" (Williams and Downie, 1966c). NOW *Glaphyrocysta.*

"*downiei*" (Sarjeant, 1960a, p.138; holotype illustrated by Downie, 1957, p.425, pl.20, fig.10) Ioannides *et al.,* 1977, p.451. The above transfer was rejected by Lentin and Williams, 1977b, p.37, the species being retained in *Acanthaulax,* since Sarjeant, 1976c, p.6 stated that the archeopyle is precingular, resulting from the loss of paraplate 3". Sarjeant and Stover, 1978, p.52 concurred with the opinion of Lentin and Williams, *op.cit.*

dubium (Jain and Millepied, 1975, p.152, pl.5, fig.75-76) Sarjeant and Stover, 1978, p.52. Campanian-Maastrichtian; formerly *Tenua.*

"*eisenackii*" Davey, 1969a, p.170, pl.8, fig.3-4; pl.9, fig.4; text-fig.16a-b. Albian. Cookson and Eisenack, 1974, p.74 considered this species to be a *jr syn.* of *Aptea polymorpha* Eisenack. O.C. See also *Aptea eisenackii.*

expansum Corradini, 1973, p.161-162, pl.24, fig.8a-b; text-fig.7. Late Cretaceous-Paleocene. Stover and Evitt, 1978, p.36 considered this to be a "problematical species".

"*exuberans*" (Deflandre and Cookson, 1955). NOW *Glaphyrocysta;* formerly *Membranilarnax pterospermoides* O. Wetzel *sensu* Pastiels, 1948, p.46, pl.5, fig.11,13-14.

granulatum (Horowitz, 1975, p.25, pl.1, fig.4) Stover and Evitt, 1978, p.36. Late Triassic; formerly *Doidyx.* O.C. Stover and Evitt, *op.cit.,* p.36 considered this to be a "problematical species". The illustrated specimen shows parasutural crests and may represent a species of *Ctenidodinium.* Conway and Cousminer, 1983 questioned the age assigned to this species, suggesting that there were caved Jurassic taxa in cuttings samples below 1899m, which is the top of the Middle Triassic.

hexalobosum (Cookson and Eisenack, 1974, p.76, pl.26, fig.6-7) Stover and Evitt, 1978, p.36. Middle Cretaceous-Senonian; formerly *Cassidium.*

hirtellum (Alberti, 1961, p.28, pl.4, fig.20) Davey, 1978, p.894. Valanginian-Hauterivian. Originally the type species of *Circulodinium;* subsequently *Canningia.*

hughesii Clarke and Verdier, 1967, p.21-22, pl.2, fig.6; text-fig.8. Cenomanian-Early Turonian.

hystrix (Eisenack, 1958, p.410, pl.23, fig.1-4; text-fig.10) Davey, 1978, p.894. Aptian; formerly the type species of *Tenua.* The transfer of this species to *Cyclonephelium* is not attributable to Sarjeant and Stover, 1978, p.52.

***CYCLONEPHELIUM* (cont'd)**

inconspicuum Duxbury, 1983, p.32, pl.3, fig.6. Late Aptian.

"*incultum*" (Morgenroth, 1966b). NOW *Glaphyrocysta*.

intonsum Duxbury, 1983, p.33-34, pl.2, fig.7; pl.10, fig.12; text-fig.13-14. Late Aptian-Early Albian.

"*intricatum*" (Eaton, 1971). NOW *Glaphyrocysta*.

"*laciniiforme*" (Gerlach, 1961). NOW *Glaphyrocysta*.

"*lemniscatum*" (Stanley, 1965). NOW *Areoligera*.

maugaad Below, 1981a, p.15, pl.11, fig.2-3; pl.15, fig.20. Hauterivian-Aptian.

membraniphorum Cookson and Eisenack, 1962b, p.495, pl.6, fig.8-14. Albian-Cenomanian.

"*microfenestratum*" (Bujak, 1976). NOW *Glaphyrocysta*.

operculatum Yu Jingxian, 1982, p.252-253, pl.7, fig.20-22. Late Jurassic-Early Cretaceous.

"*ordinatum*" (Williams and Downie, 1966c). NOW *Glaphyrocysta*.

palliatum (Brideaux, 1977, p.11-12, pl.3, fig.1-8) Below, 1981a, p.10. Barremian; formerly *Canningia*.

"*pastielsii*" (Deflandre and Cookson, 1955). NOW *Glaphyrocysta;* formerly *Membranilarnax* cf. *liradiscoides* O. Wetzel *sensu* Pastiels, 1948, p.47, pl.5, fig.15. The references to Pastiels, 1948 in Downie and Sarjeant, 1965 (as pl.5, fig.5) and in Harker and Sarjeant, 1975, p.226 (as p.47, pl.15, fig.5) are incorrect.

paucimarginatum Cookson and Eisenack, 1962b, p.494, pl.6, fig.57. ?Late Albian-Cenomanian.

paucispinum Davey, 1969a, p.170, pl.9, fig.1-2. Cenomanian.

reductum Châteauneuf, 1980, p.136, pl.21, fig.10. Late Eocene (Marinesian-Ludian).

"*regulatum*" (Jiabo, 1978). NOW *?Membranophoridium*.

"*reticulosum*" (Gerlach, 1961). NOW *?Glaphyrocysta*.

"*retiintextum*" (Cookson, 1965a). NOW *Glaphyrocysta*.

"*semicirculatum*" (Morgenroth, 1966b). NOW *Areoligera*.

***CYCLONEPHELIUM* (cont'd)**

"semitectum" (Bujak *in* Bujak *et al.*, 1980). NOW *Glaphyrocysta.*

"spinetum" (Eaton, 1976). NOW *?Glaphyrocysta.*

"tabulatum" (Davey and Verdier, 1974). NOW *Cerbia.*

"textum" (Bujak, 1976). NOW *Glaphyrocysta.*

uncinatum (Norvick, 1976, p.74-75, pl.8, fig.11-12) Stover and Evitt, 1978, p.36. Cenomanian; formerly *Adnatosphaeridium.*

vannophorum Davey, 1969a, p.168-170, pl.9, fig.3; pl.11, fig.11-12; text-fig. 16E. Cenomanian.

"variabile" (Cookson and Eisenack, 1967a). NOW *?Systematophora.*

"variatum" (Jiabo, 1978). NOW *Membranophoridium.*

"vicinum" (Eaton, 1976). NOW *?Glaphyrocysta.*

"vitilare" (Cookson, 1965b). NOW *Renidinium.*

CYCLOPSIELLA Drugg and Loeblich, 1967, p.188,190. The emendation of this genus by Jain and Dutta *in* Dutta and Jain, 1980, p.71 is not valid, since the correct reference is not given to the original description. *Collumosphaera* Jain and Dutta *in* Dutta and Jain, 1980 is herein considered to be a *jr syn.* of *Cyclopsiella.* Stover and Evitt, 1978, p.291 considered this to be an acritarch genus.

coniata Jain and Tandon, 1981, p.14, pl.2, fig.32-33. Middle Eocene.

deltoides He Cheng-quan and Li Peng, 1981, p.70, pl.35, fig.1. Late Oligocene.

**elliptica* Drugg and Loeblich, 1967, p.190, pl.3, fig.1-6; text-fig.7. Oligocene.

fruticosa (Jain and Dutta, 1980) *comb. nov.*
1980 *Collumosphaera fruticosa* Jain and Dutta *in* Dutta and Jain, p.70-71, pl.4, fig.28-36; pl.5, fig.38-43. Late Paleocene. This species was the type of the genus *Collumosphaera* Jain and Dutta *in* Dutta and Jain, 1980 which is considered herein to be a *jr syn.* of *Cyclopsiella.*

granulata He Cheng-quan and Li Peng, 1981, p.69-70, pl.35, fig.4-8. Late Oligocene.

mura Duxbury, 1983, p.67, pl.9, fig.15. Early Albian.

ornamenta Jain, 1977, p.187, pl.6, fig.72. Early Albian.

CYCLOPSIELLA **(cont'd)**

rhomboidalis He Cheng-quan and Li Peng, 1981, p.70, pl.35, fig.2; text-fig.7. Late Oligocene.

trematophora (Cookson and Eisenack, 1967a, p.136, pl.19, fig.13) Lentin and Williams, 1977b, p.39. Late Eocene; formerly *Leiosphaeridia*.

vieta Drugg and Loeblich, 1967, p.192,194, pl.3, fig.7-9; text-fig.8. Oligocene.

CYMOSOSPHAERIDIUM Davey, 1982b, p.18.

**validum* Davey, 1982b, p.18-19, pl.3, fig.5-6,8,11. Hauterivian.

CYSTIDIOPSIS Nagy, 1965, p.209. Stover and Evitt, 1978, p.291 considered this to be an acritarch genus.

**certa* Nagy, 1965, p.209-210, pl.5, fig.27-30. Middle Miocene. O.C.

"CYSTODINIOPSIS" Vozzhennikova, 1963, p.185, *nom. nud.* See Loeblich and Loeblich, 1969, p.194. The type of the genus and single species, *C. hyperxantha*" is now included in *?Palaeocystodinium*.

D

DANEA Morgenroth, 1968, p.541-542; emend. Drugg, 1970b, p.815-816.

abbreviata Damassa, 1984, p.54-55, pl.1, fig.1-6; pl.3, fig.2-6; pl.4, fig.3-4. Early-Late Eocene.

**californica* (Drugg, 1967, p.30, pl.5, fig.14-15; pl.9, fig.8) Stover and Evitt, 1978, p.152. Danian. Originally *Palmnickia;* subsequently *Samlandia.* The original type of the genus *Danea, D. mutabilis,* was considered to be a *jr syn.* of *D. californica* by Damassa, 1979b, p.193; the latter species therefore becomes the type of the genus.

chibanis Below, 1981a, p.43-45, pl.6, fig.3-4; pl.15, fig.1-2; text-fig.33-39 Gargasian.

"fimbriata" (Morgenroth, 1968) Stover and Evitt, 1978, p.152. NOW *Conneximura;* formerly *?Hystrichokolpoma.*

heterospinosa Matsuoka, 1983c, p.117-122, pl.1, fig.1-2; pl.2, fig.1-8; text-fig. 2-4. Middle Eocene.

impages Damassa, 1979a, p.821-822, pl.1, fig.1-3; pl.2, fig.1-9; text-fig.3. Early-Middle Eocene.

manicata Damassa, 1984, p.55-56, pl.1, fig.7-12; pl.2, fig.1-3; pl.3, fig.1,7-8; pl.4, fig.1-2. Early Eocene.

"mutabilis" Morgenroth, 1968, p.542-544, pl.43, fig.5-9; pl.44, fig.1-3. Danian. This species, the original type of the genus, was considered to be a *jr syn.* of *Danea californica* (Drugg, 1967) Stover and Evitt, 1978, by Damassa, 1979b, p.193. *Danea californica* therefore becomes the type of the genus.

DAPCODINIUM Evitt, 1961a, p.996; emend. Dörhöfer and Davies, 1980, p.23.

coalitum Davies, 1983, p.14, pl.1, fig.1-8; text-fig.6. Toarcian-Early Bajocian.

holotabulatum Davies, 1983, p.14-15, pl.1, fig.9-19; text-fig.7. Toarcian-Bathonian.

***DAPCODINIUM* (cont'd)**

"inornatum" (Morgenroth, 1970) Dörhöfer and Davies, 1980, p.23. Because of the distinctive morphology of this species, we herein reject this transfer and retain the species in *Maturodinium*.

**priscum* Evitt, 1961a, p.996-1001, pl.119, fig.1-14; text-fig.1-20. Hettangian.

"semitabulatum" (Morgenroth, 1970) Dörhöfer and Davies, 1980, p.23. Because of the distinctive nature of the paratabulation in this species, we herein reject this transfer and retain the species in *Mancodinium*.

DAPSILIDINIUM Bujak *et al.*, 1980, p.27-28.

?amalthei (W. Wetzel, 1966, p.317, pl.31, fig.2,2a-b) Lentin and Williams, 1981, p.68. Late Toarcian. Originally *Hystrichosphaeridium;* subsequently *?Polysphaeridium*. At the time of the transfer, Lentin and Williams, *op. cit.* questionably included this species in *Dapsilidinium*.

"asperum" (Maier, 1959) Bujak *et al.*, 1980, p.28. NOW *?Polysphaeridium*.

assamicum (Mehrotra, 1983) *comb. nov.*
1983 *Polysphaeridium assamicum* Mehrotra, 1983, p.18, pl.5, fig.4,8-9. Early Tertiary.

?belgicum (Sarjeant, 1969, p.15 = *Hystrichosphaeridium fluctuans sensu* Pastiels, 1948, p.40, pl.3, fig.16 *non* Eisenack, 1938, p.230-231, pl.16, fig.1) Lentin and Williams, 1981, p.69. Early Eocene; formerly *Polysphaeridium*. At the time of the transfer, Lentin and Williams, *op. cit.* questionably included this species in *Dapsilidinium*.

?caminuspinum (Wall, 1965a, p.165, pl.9, fig.3) Lentin and Williams, 1981, p.69. Early Sinemurian. Originally *Hystrichosphaeridium;* subsequently *?Polysphaeridium*. Stover and Evitt, 1978, p.76 considered this to be an acritarch. At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Dapsilidinium*.

chems (Below, 1982c) *comb. nov.*
1982c *Polysphaeridium chems* Below, p.27-28, pl.2, fig.8; text-fig.6b. Late Hauterivian.

"?conispinum" (Davey and Verdier, 1973) Lentin and Williams, 1981, p.69. NOW and originally *Litosphaeridium;* also formerly *Polysphaeridium*. At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Dapsilidinium*.

daveyi (Boltenhagen, 1977, p.37-38,40, pl.2, fig.3-4) Lentin and Williams, 1981, p.69. Late Cenomanian-Turonian; formerly *?Polysphaeridium*.

DAPSILIDINIUM (cont'd)

?deflandrei (Valensi, 1947, p.817, text-fig.3) Lentin and Williams, 1981, p.69. Middle Jurassic. Originally _Hystrichosphaeridium;_ subsequently _?Polysphaeridium_. At the time of the transfer, Lentin and Williams, _op. cit._ questionably included this species in _Dapsilidinium_.

duma (Below, 1982c) _comb. nov._
1982c _Polysphaeridium duma_ Below, p.28, pl.2, fig.9-12; text-fig.6a.
Albian.

?elongatum (Jain and Millepied, 1975, p.150-151, pl.5, fig.73-74) Lentin and Williams, 1981, p.69. Maastrichtian; formerly _?Polysphaeridium_. At the time of the transfer, Lentin and Williams, _op.cit._ questionably included this species in _Dapsilidinium_.

?fucosum (Valensi, 1955a, p.40, text-fig.2b) Lentin and Williams, 1981, p.69. Late Cretaceous. Originally _Micrhystridium;_ subsequently _Hystrichosphaeridium_, then _?Polysphaeridium_. At the time of the transfer, Lentin and Williams, _op.cit._ questionably included this species in _Dapsilidinium_.

granulosum (Jain and Millepied, 1975, p.151-152, pl.5, fig.69-70) Lentin and Williams, 1981, p.69. Campanian-Maastrichtian; formerly _Polysphaeridium_.

hystrichosum Islam, 1983a, p.235-236, pl.1, fig.4-6. Early Eocene.

laminaspinosum (Davey and Williams, 1966b, p.94-95, pl.8, fig.8) Lentin and Williams, 1981, p.69. Cenomanian; formerly _Polysphaeridium_.

?langii (Wall, 1965a, p.165, pl.6, fig.9-11; pl.9, fig.9; emend. Morbey, 1975, p.41-42) Lentin and Williams, 1981, p.69. Hettangian-Sinemurian. Originally _Hystrichosphaeridium;_ subsequently _?Polysphaeridium_. O.C. At the time of the transfer, Lentin and Williams, _op.cit._ questionably included this species in _Dapsilidinium_.

"?major" (Lejeune-Carpentier, 1940). NOW _Amphorosphaeridium_. This species was incorrectly included in _?Dapsilidinium_ by Lentin and Williams, 1981, p.69 who failed to effect the transfer.

marinum Ch. Singh, 1983, p.121, pl.41, fig.7-9. Cenomanian.

multispinosum (Davey, 1974, p.60, pl.7, fig.4) Bujak _et al._, 1980, p.28. Early Barremian; formerly _Polysphaeridium_.

*_pastielsii_ (Davey and Williams, 1966b, p.92-93, pl.4, fig.10) Bujak _et al._, 1980, p.28. Early Eocene; formerly _Polysphaeridium_. O.C.

DAPSILIDINIUM **(cont'd)**

?paulinae (Valensi, 1953, p.48, pl.12, fig.6) Lentin and Williams, 1981, p.70. Middle Jurassic. Originally *Hystrichosphaeridium;* subsequently *?Polysphaeridium.* At the time of the transfer, Lentin and Williams, *op. cit.* questionably included this species in *Dapsilidinium.*

pseudocolligerum (Stover, 1977, p.74-75, pl.1, fig.14-19) Bujak *et al.*, 1980, p.28. Early Oligocene-Early Miocene; formerly *Polysphaeridium.*

?pumilum (Davey and Williams, 1966b, p.93-94, pl.7, fig.3-4) Lentin and Williams, 1981, p.70. Cenomanian; formerly *?Polysphaeridium.* At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Dapsilidinium.*

?punctatum (Jain and Millepied, 1975, p.151, pl.5, fig.71-72) Lentin and Williams, 1981, p.70. Maastrichtian; formerly *?Polysphaeridium.* At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Dapsilidinium.*

?rhabdophorum (Valensi, 1955b, p.593, pl.3, fig.7) Lentin and Williams, 1981, p.70. Late Cretaceous. Originally *Hystrichosphaeridium;* subsequently *?Polysphaeridium.* At the time of the transfer, Lentin and Williams, *op. cit.* questionably included this species in *Dapsilidinium.*

simplex (White, 1842, p.38, pl.4, div.3, fig.10) Bujak *et al.*, 1980, p.28. Late Cretaceous. Originally *Xanthidium;* subsequently *Hystrichosphaeridium,* then *?Polysphaeridium.*

stelacum Islam, 1983a, p.236, pl.1, fig.7-8. Early Eocene.

warrenii (Habib, 1976, p.383, pl.2, fig.4,6a-b) Lentin and Williams, 1981, p.70. Berriasian-Aptian?; formerly *Polysphaeridium.*

DEFLAGYMNIUM Olaru, 1978, p.82.

**elongatum* Olaru, 1978, p.82, pl.8, fig.8. Maastrichtian.

DEFLANDREA Eisenack, 1938, p.187; emend. Williams and Downie, 1966c, p.231; emend. Lentin and Williams, 1976, p.35-36.

"*acribes*" (Davey and Verdier, 1971). NOW *Angustidinium.*

"*acuminata*" (Cookson and Eisenack, 1958). NOW *Isabelidinium.*

"*acutula*" (Wilson, 1967b). NOW *Alterbidinium.*

"*aenigmatica*" (Boltenhagen, 1977). NOW *Senegalinium.*

"*albertii*" (Corradini, 1973). NOW *Ceratiopsis.*

DEFLANDREA (cont'd)

"amphiata" (McIntyre, 1975). NOW *?Isabelidinium.*

andromiensis Vozzhennikova, 1967, p.142-143, pl.71, fig.3-4; pl.72, fig.1-2. Eocene.

antarctica Wilson, 1967a, p.58,60, fig.23-24,26-27. Erratics, probably Eocene.

"?apicidentata" (Jiabo, 1978). NOW *Geiselodinium.* Jiabo, *op.cit.*, p.81 questionably included this species in *Deflandrea.*

arcuata Vozzhennikova, 1967, p.143-144, pl.66, fig.1; pl.68, fig.3a-b. Late Eocene-Early Oligocene.

subsp. *oporiensis* Grigorovich, 1971, p.92, pl.1, fig.5) Lentin and Williams, 1977b, p.40. Eocene; formerly *Deflandrea arcuata* forma *oporiensis.*

"armata" (Cookson and Eisenack, 1970a). NOW *?Chatangiella.*

"asymmetrica" (Wilson, 1967a). NOW *?Senegalinium.*

"asymmetrica" (Davey and Verdier, 1971). NOW *Subtilisphaera deformans.* Lentin and Williams, 1976, p.119 reasoned that with the transfer of this species from *Deflandrea* to *Subtilisphaera,* the original name was no longer a *jr hom.;* therefore the *nom. subst., Deflandrea daveyi* and *Deflandrea deformans,* became superfluous. Since *Deflandrea asymmetrica* was illegitimate when proposed, Stover and Evitt, 1978, p.239 pointed out that this was an incorrect procedure.

"bakeri" (Deflandre and Cookson, 1955). NOW *Isabelidinium.*

forma *"pellucida"* (Deflandre and Cookson, 1955). NOW *Isabelidinium pellucidum.*

"balcattensis" (Cookson and Eisenack, 1969). NOW *Subtilisphaera.*

"balmei" (Cookson and Eisenack, 1962b). NOW *Isabelidinium.*

"baltica" (Vozzhennikova, 1967) Lentin and Williams, 1976, p.38. NOW *Ceratiopsis;* formerly *Cerodinium.*

"belfastensis" (Cookson and Eisenack, 1961a). NOW *Isabelidinium.*

"biapertura" (McIntyre, 1975). NOW *?Chatangiella.*

"bicavata" (Jain and Millepied, 1973) Herngreen, 1975, p.61. The transfer of this species from *Senegalinium* to *Deflandrea* was rejected by Lentin and Williams, 1977b, p.40, because the archeopyle is a standard hexa 2a intercalary.

***DEFLANDREA* (cont'd)**

"boloniensis" (Riegel, 1974). NOW *Phelodinium.*

"campbellensis" (Wilson, 1967b). NOW *Chatangiella.*

carpatica Grigorovich, 1969b, p.68-69, pl.1, fig.2. Paleocene.

"cincta" (Cookson and Eisenack, 1958). NOW *Ascodinium.*

"conica" Vozzhennikova, 1960, *nom. nud.* No description.

"conorata" (Stover, 1973). NOW *Manumiella.*

"cooksoniae" (Alberti, 1959b). NOW *Isabelidinium.*

"cordifera" (May, 1980). NOW *Ceratiopsis.*

cornumammillata Jan du Chêne and Châteauneuf, 1975, p.31-32, pl.2, fig.1-13. Late Paleocene (Early Ilerdian).

"coronata" (McIntyre, 1975). NOW *Chatangiella.*

"corrugatella" May, 1980: shown in range chart, but not formally described.

"crassistriata" (Jain *et al.,* 1975). NOW *Ceratiopsis.*

"cretacea" (Cookson, 1956). NOW *?Manumiella.*

"cuvillieri" (Boltenhagen, 1977). NOW *Senegalinium.*

cygniformis Pöthe de Baldis, 1966, p.221, pl.2, fig.C. Early Tertiary.

"dakotaensis" (Stanley, 1965). NOW *?Chatangiella.*

?damasii (Lejeune-Carpentier, 1942, p.B185-186, fig.9-14) emend. Lejeune-Carpentier and Sarjeant, 1981. p.16. Senonian. Originally *Peridinium;* subsequently *?Cooksoniella,* then *Palaeoperidinium.* Although Lejeune-Carpentier and Sarjeant, 1981, p.17 stated that *?D. damasii* has a broad-hexa archeopyle, this is not convincingly shown in the accompanying illustrations. Accordingly, we herein accept this as a provisional species of *Deflandrea.*

danica Lange, 1969, p.114-115, pl.1, fig.6. Danian.

"dartmooria" (Cookson and Eisenack, 1965b). NOW *Ceratiopsis.*

"daveyi" (Lentin and Williams, 1973, p.40). This name designated as a *nom. subst.* for *Deflandrea asymmetrica* Davey and Verdier, 1971 (*non* Wilson, 1967), is a *jr syn.* of *"Deflandrea deformans"* Davey and Verdier, 1973. The latter species was transferred to *Subtilisphaera* by Lentin and Williams, 1976, p.119 as *Subtilisphaera deformans.*

***DEFLANDREA* (cont'd)**

"*decorosa*" (McIntyre, 1975). NOW *Chatangiella*.

"*deformans*" Davey and Verdier, 1973, p.197, *nom. nov. pro D. asymmetrica* Davey and Verdier, 1971, p.39-40, pl.2, fig.4,6; *non D. asymmetrica* Wilson, 1967a, p.62-63. Lentin and Williams, 1976, p.119 reasoned that with the transfer of the former species from *Deflandrea* to *Subtilisphaera*, the original name was no longer a *jr hom.*; therefore the *nom. subst. Deflandrea deformans* became superfluous. Stover and Evitt, 1978, p.239 correctly retained the species as *Subtilisphaera deformans*.

"*delicata*" (Baltes *ex* Lentin and Williams, 1973). NOW *Manumiella*.

delineata Cookson and Eisenack, 1965c, p.140-141, pl.18, fig.3-5; text-fig.1. Paleocene.

denticulata Alberti, 1959b, p.102-103, text-fig.1. Paleocene-Early Eocene.

subsp. *minor* (De Coninck, 1969, p.16, pl.1, fig.16-17; pl.2, fig.1-2) Lentin and Williams, 1973, p.40. Early Eocene; formerly *Deflandrea denticulata* forma *minor*.

"*depressa*" (Morgenroth, 1966a). NOW *Ceratiopsis*.

"*diebelii*" (Alberti, 1959b). NOW *Ceratiopsis*.

subsp. "*rigida*" (May, 1980). NOW *Ceratiopsis diebelii* subsp. *rigida*.

"*dilwynensis*" (Cookson and Eisenack, 1965c). NOW *?Senegalinium*.

dissoluta Vozzhennikova, 1967, p.144, pl.73, fig.1-4. Eocene.

"*distincta*" (Wilson, 1967a). NOW *?Alterbidinium*.

"*ditissima*" (McIntyre, 1975). NOW *Chatangiella*.

"*dongyingensis*" (Jiabo, 1978). NOW *Subtilisphaera*.

"*druggii*" (Stover, 1973). NOW *Manumiella*.

"*?dubia*" (Jain and Millepied, 1973) Herngreen, 1975, p.61. NOW *?Andalusiella*; formerly *Senegalinium*. Lentin and Williams, 1976, p.40 questionably included this species in *Deflandrea*. Stover and Evitt, 1978, p.101 considered this to be a "problematical species" of *Deflandrea*.

"*echinoidea*" (Cookson and Eisenack, 1960a). NOW *Spinidinium*.

"*ectorugosa*" (Archangelsky, 1969b). NOW *Senegalinium*.

***DEFLANDREA* (cont'd)**

"endopapillata" Archangelsky, 1969b, p.192-193, pl.1, fig.8-9; pl.2, fig.3-4. Late Eocene. *Jr syn.* of *Deflandrea heterophlycta* according to Stover and Evitt, 1978, p.101.

eocenica Baltes *ex* Lentin and Williams, 1973, p.40, *Deflandrea eocenica* (provisional designation) Baltes, 1969, p.34, pl.5, fig.8-9; Holotype - fig.9. Early Eocene.

"euthema" (Davey and Verdier, 1971). NOW *Eurydinium.*

"extensa" (Stover, 1974). NOW *Lentinia.*

"extrema" (Cookson and Eisenack, 1974). NOW *?Isabelidinium.*

"eyrensis" (Cookson and Eisenack, 1971). NOW *Eurydinium.*

"?filigrana" (Benedek, 1972). NOW *Phthanoperidinium.* Benedek, 1972, p.12 questionably included this species in *Deflandrea.*

flounderensis Stover, 1974, p.174-175, pl.3, fig.1a-c,2. Early Eocene.

"foliacea" (Eisenack and Cookson, 1960). NOW *Subtilisphaera.*

foveolata Wilson, 1984b, p.547, fig.2-11. Paleocene.

fuegiensis Menendez, 1965, p.8-9, pl.1, fig.1-3; pl.3, fig.16. Late Cretaceous.

"gaditana" (Riegel, 1974). NOW *Phelodinium.* The transfer of this species to *Senegalinium* by Harland, 1977a, p.189 was rejected by Lentin and Williams, 1977b, p.42. The transfer of this species to *Lejeunia* by Lentin and Williams, 1980, p.41 was rejected by Lentin and Williams, 1981, p.74. The transfer of this species to *Lejeunecysta* by Wilson and Clowes, 1980, p.63 is herein rejected.

galeata (Lejeune-Carpentier, 1942, p.186-188, fig.15-20) Lentin and Williams, 1973, p.41; emend. Lejeune-Carpentier and Sarjeant, 1981, p.18-19. Senonian; formerly *Peridinium.*

"gallia" (Davey and Verdier, 1973). NOW *Isabelidinium.*

"gambangensis" (Cookson and Eisenack, 1970a). NOW *Eucladinium.*

"glabra" (Cookson and Eisenack, 1969). NOW *Isabelidinium.*

"globosa" (Davey, 1970). NOW *?Isabelidinium.*

"glomerata" (Davey, 1970). NOW *Eurydinium.*

DEFLANDREA (cont'd)

granulata Menendez, 1965, p.9-10, pl.1, fig.4. Eocene-Oligocene.

"granulifera" (Manum, 1963). NOW *Chatangiella.*

var. *"tenuis"* (Davey, 1970). NOW *Chatangiella granulifera* subsp. *tenuis.*

"granulosa" Cookson and Eisenack, 1965a, p.122, pl.11, fig.8-9. Late Eocene. *Jr syn.* of *Deflandrea phosphoritica* according to Stover, 1974, p.177.

"granulostriata" (Jain and Millepied, 1973) Lentin and Williams, 1976, p.41. NOW *Ceratiopsis;* formerly *Senegalinium.*

heterophlycta Deflandre and Cookson, 1955, p.249, pl.5, fig.6; text-fig.5. Late Eocene. See also *Deflandrea endopapillata* which is a *jr syn.* of this species.

subsp. *"pusulosa"* (Rozen, 1965, p.293-294, pl.1, fig.3-4; text-fig.2) Lentin and Williams, 1973, p.41. This is considered to be a *jr syn.* of *Deflandrea phosphoritica* by Lentin and Williams, 1976, p.41.

hialina Baltes *ex* Lentin and Williams, 1973, p.41, *Deflandrea hialina* (provisional designation) Baltes, 1969, p.34, pl.1, fig.3-4; Holotype - fig.4. Oligocene-Early Miocene.

"ingramii" (Cookson and Eisenack, 1970a). NOW *Eurydinium.*

"inmoechinata" (Heisecke, 1970). NOW *?Spinidinium.*

"?kansana" (Tasch, 1964) Lentin and Williams, 1973, p.42. NOW *?Ascodinium.* At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Deflandrea.*

"korojonensis" (Cookson and Eisenack, 1958). NOW *Isabelidinium.*

"laevigata" (Malloy, 1972). NOW *Senegalinium.*

"lata" (Cookson and Eisenack, 1968). NOW *Manumiella.*

"leptoderma" (Vozzhennikova, 1963). NOW and formerly *Ceratiopsis.* The transfer of this species from *Ceratiopsis* to *Deflandrea* by Lentin and Williams, 1976, p.41 was rejected by Lentin and Williams, 1977b, p.21.

leptodermata Cookson and Eisenack, 1965a, p.121-122, pl.11, fig.6-7. Late Eocene. See also *Deflandrea micropoda* which is a *jr syn.* of this species.

***DEFLANDREA* (cont'd)**

"limpida" Ch. Singh, 1971, p.359-361, pl.61, fig.1-12; text-fig.62. Lentin and Williams, 1973, p.43 considered this species to be a *jr syn.* of *Spinidinium vestitum* Brideaux. Below, 1981a, p.123 transferred this species to *Chichaouadinium*.

"longispinosa" (Wilson, 1968). NOW *Apectodinium*.

"macmurdoensis" (Wilson, 1967a). NOW *Spinidinium*.

"macrocysta" (Cookson and Eisenack, 1960a). NOW *Senegalinium*.

"madurensis" (Cookson and Eisenack, 1970a). NOW *Eucladinium*.

"magna" (Davey, 1970). NOW *Isabelidinium*.

"magnifica" (Stanley, 1965). NOW *Phelodinium*.

"manumii" (Cookson and Eisenack, 1970a). NOW *Chatangiella madura*.

"markovae" (Vozzhennikova, 1967). NOW and formerly *Ceratiopsis*. The transfer of this species from *Ceratiopsis* to *Deflandrea* by Lentin and Williams, 1976, p.42 was rejected by Lentin and Williams, 1977b, p.21.

medcalfii Stover, 1974, p.175-176, pl.3, fig.3a-c. Middle Paleocene. The designation of *D. medcalfii* as a subspecies of *Deflandrea dartmooria* by Lentin and Williams, 1976, p.39 was rejected by Lentin and Williams, 1981, p.75.

"menendezii" Pöthe de Baldis, 1966, p.223, pl.2, fig.A. This species, which is based on the observation of one specimen, was considered to be a *jr syn. of Deflandrea phosphoritica* by Lentin and Williams, 1976, p.42.

"micracantha" (Cookson and Eisenack, 1960a). NOW *Chatangiella*.

"microarma" (McIntyre, 1975). NOW *Isabelidinium*.

"microgranulata" (Stanley, 1965). NOW *Senegalinium*.

"micropoda" Cookson and Eisenack, 1974, p.49, pl.47, fig.11. Late Eocene. *Jr syn.* of *Deflandrea leptodermata* according to Stover and Evitt, 1978, p.101.

"microspinosa" (Boltenhagen, 1977). NOW *Senegalinium*.

"microverrucosa" Yu Jingxian and Zhang Wangping, 1980. NOW *?Isabelidinium*.

"minor" (Alberti, 1959b). NOW *Alterbidinium*.

***DEFLANDREA* (cont'd)**

"minor" (Cookson and Eisenack, 1960a). *Jr hom.* of *D. minor* Alberti, 1959. NOW *Isabelidinium balmei.*

"minuta" (Jiabo, 1978). NOW *Sanshuia.*

"montanaensis" (Harland, 1977a). NOW *Alterbidinium.*

"multispinosa" (Cookson and Eisenack, 1970a). NOW *?Chatangiella.*

"nucula" (Cookson and Eisenack, 1962b). NOW *Amphidiadema.*

"?obliquipes" (Deflandre and Cookson, 1955). NOW *Ceratiopsis.* Stover and Evitt, 1978, p.101 considered this to be a "provisionally accepted species" of *Deflandrea.*

"obscura" (Drugg, 1967). NOW *Senegalinium.*

oebisfeldensis Alberti, 1959b, p.95-96, pl.8, fig.10-13. Paleocene-Early Eocene.

subsp. *angustata* (Vozzhennikova, 1967, p.146-147, pl.72, fig.3-4) Lentin and Williams, 1973, p.43. Eocene; formerly *Deflandrea oebisfeldensis* forma *angustata.*

subsp. *oebisfeldensis* Alberti, 1959b, p.95-96, pl.8, fig.10-13. Paleocene-Early Eocene.

subsp. *ovalis* (Vozzhennikova, 1967, p.146, pl.71, fig.2) Lentin and Williams, 1973, p.43. Eocene; formerly *Deflandrea oebisfeldensis* forma *ovalis.*

"ornata" (May, 1980). NOW *Spinidinium.*

"ovata" (Jiabo, 1978). NOW *Sanshuia.* See also *Subtilisphaera.*

?pachyceros Deflandre and Cookson, 1955, p.252, pl.4, fig.7. Late Paleocene-Early Eocene. Stover and Evitt, 1978, p.101 considered this to be a "provisionally accepted species".

"?pannucea" (Stanley, 1965). NOW *Ceratiopsis.* Stover and Evitt, 1978, p.101 considered this to be a provisionally accepted species of *Deflandrea.*

?papillata Oleinik, 1976b, p.226-227, pl.1, fig.6-7. Late Eocene. Because of the uncertainty as to the morphology of this species, Lentin and Williams, 1981, p.77 questionably included it in *Deflandrea.*

"parva" (Cookson and Eisenack, 1958). NOW *Ascodinium.*

***DEFLANDREA* (cont'd)**

"pellucida" (Deflandre and Cookson, 1955). NOW *Isabelidinium;* formerly *Deflandrea bakeri* forma *pellucida.*

"pentagonalis" (Corradini, 1973). NOW *Phelodinium.*

"pentaradiata" (Cookson and Eisenack, 1965c). NOW *?Alterbidinium.*

subsp. *"preceda"* (Cookson and Eisenack, 1974). NOW *?Alterbidinium pentaradiata* subsp. *preceda.*

"perlucida" (Alberti, 1959b). NOW *Subtilisphaera.*

**phosphoritica* Eisenack, 1938b, p.187, text-fig.6. Late Eocene-Early Oligocene. See also *Deflandrea granulosa, D. menendezii* and *D. heterophlycta* subsp. *pusulosa* which are *jr synonyms* of this species.

subsp. *australis* Cookson and Eisenack, 1961b, p.39-40, pl.1, fig.2-3. Eocene.

var. *lata* (Vozzhennikova, 1967, p.142, pl.69, fig.5-6) Lentin and Williams, 1973, p.44. Eocene-Early Oligocene; formerly *Deflandrea phosphoritica australis* forma *lata.*

subsp. *phosphoritica* Eisenack, 1938b, p.187, text-fig.6. Late Eocene-Early Oligocene.

var. *attenuata* (Vozzhennikova, 1967, p.140-141, pl.65, fig.2-4; pl.67, fig.2-4; pl.69, fig.4; pl.70, fig.1,4,6-7,10) Lentin and Williams, 1973, p.44. Eocene-Early Oligocene; formerly *Deflandrea phosphoritica phosphoritica* forma *attenuata.*

subsp. *vozzhennikovae* Grigorovich, 1972, p.66, pl.1, fig.3. Early Miocene. Lentin and Williams, 1976, p.43 questioned the age assignment of this subspecies.

"pilosa" (Davey, 1969b). NOW *Alterbidinium.*

"pirnaensis" (Alberti, 1959b). NOW *Subtilisphaera.*

?plea (Tasch, 1964, p.196, pl.1, fig.15) Lentin and Williams, 1973, p.44. Albian. Originally *Peridinium.* The transfer of this species to *?Gonyaulacysta* by Lentin and Williams, 1976, p.43 was rejected by Stover and Evitt, 1978, p.160. At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Deflandrea.*

"pontis-mariae" (Deflandre, 1936b) Davey, 1970, p.341. NOW *Subtilisphaera.*

DEFLANDREA (cont'd)

"?prutensis" (Grigorovich, 1971) Stover and Evitt, 1978, p.101. The transfer of this species from *Ceratiopsis* to *?Deflandrea* by Stover and Evitt, *op.cit.* was rejected by Lentin and Williams, 1981, p.39. At the time of the transfer, Stover and Evitt, 1978, p.101 considered this to be a "provisionally accepted species" of *Deflandrea.*

"psilata" Yu Jingxian and Zhang Wangping, 1980. NOW *Isabelidinium.*

"pulchra" (Benson, 1976). NOW *Spinidinium.*

quiriquinaensis Takahashi, 1979, p.33, pl.1, fig.1a-c,2a-b,3. Late Cretaceous.

"raijae" (Kjellström, 1973). NOW *Manumiella.*

"rectangularis" (Cookson and Eisenack, 1962b). NOW *Amphidiadema.*

subsp. *"samuelsonii"* (Kjellström, 1973) Lentin and Williams, 1975, p.2149; formerly *Deflandrea rectangularis* var. *samuelsonii.* Gocht, 1976, p.322 considered this taxon to be a *jr syn.* of *Hystrichosphaeropsis quasicribrata* (O. Wetzel) Gocht. For complete citation see *Amphidiadema rectangularis* subsp. *samuelsonii.*

"rhombica" (Cookson and Eisenack, 1974). NOW *Spinidinium echinoideum* subsp. *rhombicum.*

"rhombohedra" (Benson, 1976). NOW *Andalusiella.*

"rhombovalis" (Cookson and Eisenack, 1970a). NOW *?Isabelidinium.*

robusta Deflandre and Cookson, 1955, p.250, pl.4, fig.9. Eocene.

"rotundata" (Eisenack and Cookson, 1960). NOW *Subtilisphaera.*

"sagittula" (Drugg, 1970b). NOW *Spinidinium.*

"scheii" (Manum, 1963). NOW *?Chatangiella.*

scolensis Grigorovich, 1971, p.92, pl.1, fig.3. Eocene.

"sergipensis" (Herngreen, 1975). NOW *Senegalinium.*

"serratula" (Cookson and Eisenack, 1958). NOW *Chatangiella.*

severnensis Benson, 1976, p.195-196, pl.10, fig.1-3. Late Maastrichtian.

"sibirica" (Vozzhennikova, 1963) Lentin and Williams, 1976, p.44. NOW *Ceratiopsis.* Originally *Cerodinium.*

DEFLANDREA (cont'd)

"speciosa" (Alberti, 1959b). NOW *Ceratiopsis.*

subsp. *"glabra"* (Gocht, 1969). NOW *Ceratiopsis speciosa* subsp. *glabra;* formerly *Deflandrea speciosa* forma *glabra.*

"spectabilis" (Alberti, 1959b) Lentin and Williams, 1973, p.45. NOW *Chatangiella.*

"spicata" (May, 1980). NOW *Andalusiella.*

"spinosissima" (Cookson and Eisenack, 1970a). NOW *Eucladinium.*

spinulosa Alberti, 1959b, p.95, pl.8, fig.8-9. Middle-Late Oligocene.

"stagonoides" (Benedek, 1972) Lentin and Williams, 1976, p.44. NOW *Senoniasphaera;* formerly *Ascodinium.*

"striata" (Drugg, 1967). NOW *Ceratiopsis.*

"subquadra" (Corradini, 1973). NOW *Ceratiopsis.*

"sverdrupiana" (Manum, 1963). NOW *Spinidinium.*

"?tenera" (Krutzsch, 1962). NOW *Geiselodinium.* Krutzsch, 1962, p.44 questionably included this species in *Deflandrea.*

"terrula" (Davey, 1974). NOW *?Subtilisphaera.*

"thomasii" (Cookson and Eisenack, 1961a). NOW *Isabelidinium.*

translucida Châteauneuf, 1980, p.138, pl.22, fig.9; pl.23, fig.6. Late Eocene (Lutetian-Ludian).

tribulosa Islam, 1983c, p.85, pl.1, fig.9-10. Middle Eocene.

"tripartita" (Cookson and Eisenack, 1960a). NOW *Chatangiella.*

truncata Stover, 1974, p.176-177, pl.5, fig.2,3a-c. Early Eocene.

"tubifera" (Cookson and Eisenack, 1982). NOW *?Chatangiella.*

"ventriosa" (Alberti, 1959b). NOW *Subtilisphaera.*

"verrucosa" (Manum, 1963). NOW *Chatangiella.*

"vestita" (Brideaux, 1971) Sverdlove and Habib, 1974, p.59-60. NOW *Chichaouadinium;* formerly *Spinidinium.*

DEFLANDREA (cont'd)

"victoriensis" (Cookson and Manum, 1964). NOW *Chatangiella.*

"wardenensis" (Williams and Downie, 1966c). NOW *Ceratiopsis.*

"warrenii" (Schumacker-Lambry, 1978). NOW *Ceratiopsis.*

"?wellingtoniana" (Tasch, 1963). This species is based on a mineral grain; see Stover and Evitt, 1978, p.265. For complete citation see *Nannoceratopsiella wellingtoniana.* Tasch, 1963, p.336 questionably included this species in *Deflandrea.*

"wetzelii" (Morgenroth, 1966a). NOW *Lentinia.*

DEFLANDRIDIUM Nagy, 1969, p.294. Stover and Evitt, 1978, p.291 considered this to be an acritarch genus.

**stellatum* Nagy, 1969, p.294, pl.2, fig.1,3-4,6. Late Miocene.

DESMOCYSTA Duxbury, 1983, p.43-44.

**plekta* Duxbury, 1983, p.45, pl.8, fig.11; text-fig.20-21. Early-Late Aptian.

DIACANTHUM Habib, 1972, p.376. Lentin and Williams, 1981, p.80 accepted the generic circumscription of Stover and Evitt, 1978, p.152, and accordingly rejected the contention of Below, 1981a, p.59 that *Diacanthum* is a *jr syn.* of *Occisucysta* Gitmez.

filapicatum (Gocht, 1970b, p.134-135, pl.26, fig.4,6-9; pl.27, fig.1-3,7; pl.28, fig.3; pl.31, fig.1-5; text-fig.2a,3-4) Stover and Evitt, 1978, p.152. Early Bathonian; formerly *Gonyaulacysta.*

**hollisteri* Habib, 1972, p.376-377, pl.9, fig.1,3; pl.10, fig.1; text-fig.2. Probably Valanginian. Lentin and Williams, 1981, p.80 rejected the transfer of this species to the genus *Occisucysta* Gitmez by Below, 1981a, p.60.

tenuiceras (Eisenack, 1958, p.389, pl.21, fig.14-15, pl.22, fig.1-3; pl.24, fig.2) Stover and Evitt, 1978, p.152. Late Barremian-Aptian. Originally *Gonyaulax;* subsequently *?Gonyaulacysta.* Lentin and Williams, 1981, p.80 rejected the transfer of this species to the genus *Occisucysta* Gitmez by Below, 1981a, p.63.

DIACROCANTHIDIUM Deflandre and Foucher, 1967, p.3. The type of this genus, *"D. echinulatum"*, was invalidly transferred from *Palaeostomocystis.* See Loeblich and Loeblich, 1970, p.200.

**echinulatum* (Deflandre, 1937b, p.55, pl.11, fig.9) Loeblich and Loeblich, 1970, p.200. Late Cretaceous; formerly *Palaeostomocystis.* O.C. See also *Cleistosphaeridium parvum* which is a *jr syn.* of this species.

***DIACROCANTHIDIUM* (cont'd)**

spinigerum De Coninck, 1969, p.43-44, pl.13, fig.11-13. Early Eocene.

ungaricum Fedorova-Shakhmundes, 1976, p.93-94, pl.1, fig.1. Early Valanginian.

DICHADOGONYAULAX Sarjeant, 1966b, p.153; emend. Sarjeant, 1975a p.50; emend. Woollam, 1983, p.193. Lentin and Williams, 1973, p.46 considered this genus to be a *jr syn.* of *Ctenidodinium* Deflandre; emend. Sarjeant. Sarjeant, 1975a, p.50, however, refuted the above authors' findings, preferring to retain *Dichadogonyaulax* as a distinct and separate genus. Stover and Evitt, 1978, p.203-204 agreed with Lentin and Williams, 1973 and, where necessary, transferred the species to *Ctenidodinium*. Woollam, 1983, p.193 differentiated *Dichadogonyaulax* from *Ctenidodinium* on the basis of the cingular crests: in *Dichadogonyaulax* the cingular crests are symmetrical; in *Ctenidodinium* the cingular crests are asymmetrical, with the posterior being the larger.

"adela" (Fenton *et al.*, 1980). NOW *Bradleyella.*

"cristata" (Horowitz, 1975) Fensome and Sarjeant, 1982, p.56. Originally *Brotzenia;* subsequently *?Ctenidodinium*. *Jr syn.* of *Ctenidodinium ornatum* according to Woollam, 1983, p.190. See discussion under *"?Ctenidodinium cristatum"*.

**culmula* (Norris, 1965, p.793-795, fig.1-2,6-9) Loeblich and Loeblich, 1968, p.211. Portlandian; formerly *Gonyaulax*. See also discussion under *"Ctenidodinium culmulum"*. The transfer of this species to *Avellodinium* by Davey, 1982b, p.26 is herein rejected, as such a transfer would make *Avellodinium* a *jr syn.* of *Dichadogonyaulax*.

"gochtii" (Sarjeant, 1976a). NOW *Korystocysta.*

"kettonensis" (Sarjeant, 1976a). NOW *Korystocysta.*

"norrisii" (Pocock, 1972) Sarjeant, 1975a, p.55. NOW *Korystocysta.* Originally *Leptodinium*. See also *Ctenidodinium.*

"pannea" (Norris, 1965) Sarjeant, 1969, p.14. Kimmeridgian-Portlandian. NOW *Ctenidodinium;* formerly *Leptodinium.*

rotunda (Dodekova, 1975, p.19-20, pl.4, fig.13-14; text-fig.1) Woollam, 1983, p.193. Late Bathonian; formerly *Ctenidodinium.*

schizoblata (Norris, 1965, p.798-800, fig.4-5,14-17) Sarjeant, 1969, p.14. Portlandian; formerly *Leptodinium*. See also discussion under *"Ctenidodinium schizoblatum"*.

DICHADOGONYAULAX (cont'd)

sellwoodii Sarjeant, 1975a, p.52,55, pl.1, fig.A-H; pl.2, fig.I-K; pl.3, fig. L-Q. Bathonian. The transfer of this species to the genus *Ctenidodinium* by Stover and Evitt, 1978, p.204 was in essence rejected when Woollam, 1983, p.193 retained it in *Dichadogonyaulax*.

"*stauromatos*" Sarjeant, 1976a, p.9-11, pl.2, fig.4; pl.3, fig.5-6; text-fig.1A-C. Bathonian. *Jr syn.* of *Dichadogonyaulax sellwoodii* according to Riley and Fenton, 1982, p.199. See also "*Ctenidodinium stauromatos*".

DICONODINIUM Eisenack and Cookson, 1960, p.3; emend. Morgan, 1977, p.125.

"*acutum*" Jain and Millepied, 1973, p.30, pl.3, fig.41-42. Aptian. *Jr syn.* of *Laciniadinium arcticum* according to Morgan, 1977, p.126.

"*arcticum*" (Manum and Cookson, 1964). NOW *Laciniadinium*.

?*caulleryi* (Deflandre, 1935, p.229, pl.6, fig.4) Deflandre, 1966, p.4. Senonian; formerly *Palaeoperidinium*. This species was questionably retained in *Diconodinium* by Morgan, 1977, p.129.

cristatum Cookson and Eisenack, 1974, p.77, pl.24, fig.3-5; emend. Morgan, 1977, p.126. Albian-Cenomanian.

"*dabendorfense*" (Alberti, 1961) Lentin and Williams, 1973, p.46. NOW ?*Luxadinium*; formerly *Gymnodinium*. Morgan, 1977, p.129 retained this species in *Diconodinium* because, "it is too poorly known for confident transfer elsewhere".

"*davidii*" (Morgan, 1975). NOW *Chichaouadinium*.

dispersum (Cookson and Eisenack, 1958, p.39, pl.10, fig.12,14) Eisenack and Cookson, 1960, p.3; emend. Morgan, 1977, p.127. Albian-Cenomanian; formerly *Palaeohystrichophora*.

distinctum Jain and Millepied, 1975, p.154-155, pl.6, fig.98-99. Campanian-Maastrichtian.

?*fehmarnense* (Morgenroth, 1966a, p.4-5, pl.1, fig.1) Lentin and Williams, 1973, p.46. Early Eocene; formerly *Gymnodinium*. At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Diconodinium*. Morgan, 1977, p.129 retained this species in *Diconodinium* because, "it is too poorly known for confident transfer elsewhere".

"*firmum*" (Harland, 1973). NOW *Laciniadinium*.

?*glabrum* Eisenack and Cookson, 1960, p.3-4, pl.1, fig.11. Late Albian-Cenomanian. This species was questionably retained in *Diconodinium* by Morgan, 1977, p.129.

***DICONODINIUM* (cont'd)**

gracile Oleinik, 1976b, p.224-225, pl.1, fig.1-2. Late Eocene-Late Oligocene.

"*inequicornutum*" (Baltes, 1971 ex Stover and Evitt, 1978). NOW *Komewuia*. See also *Pontiadinium*.

"*inflatum*" (Eisenack and Cookson, 1960). NOW *?Laciniadinium*.

longicornis Olaru, 1978, p.38, pl.1, fig.3. Campanian.

minutum (Deflandre and Cookson, 1955, p.257, fig.4) Deflandre and Deflandre-Rigaud, 1966. Santonian; formerly *Palaeohystrichophora*. Since the holotype and only specimen of this species is lost, Lentin and Williams, 1981, p.82 did not concur with Morgan, 1977, p.130 in his statement that *D. minutum* is conspecific with *Isabelidinium balmei* (as *Alterbia balmei)*.

**multispinum* (Deflandre and Cookson, 1955, p.257, pl.1, fig.5) Eisenack and Cookson, 1960, p.3; emend. Morgan, 1977, p.127-128. Santonian; formerly *Palaeohystrichophora*.

paucigranulatum Burger, 1980a, p.86, pl.44, fig.1-3. Aptian.

pelliferum (Cookson and Eisenack, 1958, p.38, pl.10, fig.11) Eisenack and Cookson, 1960, p.3; emend. Morgan, 1977, p.128. Albian; formerly *Palaeohystrichophora*.

psilatum Morgan, 1977, p.128, pl.1, fig.5. Albian-Maastrichtian.

"*pusillum*" Ch. Singh, 1971, p.383-384, pl.68, fig.5-8. Middle-Late Albian. *Jr syn.* of *Diconodinium multispinum* according to Morgan, 1977, p.127. See also Below, 1981a, p.124.

?rhombiforme Vozzhennikova, 1967, p.50, pl.7, fig.1-4; pl.15, fig.5. Turonian. O.C. This species was questionably retained in *Diconodinium* by Morgan, 1977, p.129.

"*tenuistriatum*" (Eisenack and Cookson, 1960). NOW *Laciniadinium*.

ventriosum (Alberti, 1961, p.5-6, pl.3, fig.5) Lentin and Williams, 1973, p.47. Turonian; formerly *Gymnodinium*. Morgan, 1977, p.130 was in error when he stated that "*Gymnodinium ventriosum*" was transferred to *Subtilisphaera* by Jain and Millepied, 1973, p.27.

wilsonii Aurisano, 1984, p.3,5, fig.4A-D. Early Maastrichtian.

"DICTYOPYXIDIA" Eisenack, 1961, p.316 (*nom. subst. pro Dictyopyxis* Cookson and Eisenack, 1960b (March)). Sarjeant, 1976a, p.23-24 considered this genus to be a *jr syn.* of *Ellipsoidictyum* Klement, 1960 (February). Sarjeant, *op.cit.* also considered the type of the genus *"Dictyopyxidia"*, *"D. areolata"*, to be a *jr syn.* of *Ellipsoidictyum cinctum* Klement. The three remaining species in *"Dictyopyxidia"* were transferred to *Ellipsoidictyum* by Lentin and Williams, 1977b, p.56. *Dictyopyxidia punctata* Jain, 1977, was transferred to *Ellipsoidictyum* by Below, 1981a, p.47.

"DICTYOPYXIS" Cookson and Eisenack, 1960b, p.255. *Non Dictyopyxis* Ehrenberg, which is a diatom. See *Dictyopyxidia.* Sarjeant, 1976a, p.23-24 gave a detailed review of the above genera.

DICTYOSPHAERIDIUM W. Wetzel, 1952, p.406; emend. Sarjeant, 1984c, p.140-141. This is an acritarch according to Sarjeant, 1984c, p.140-142. Stover and Evitt, 1978, p.291 suggested that it is possibly a radiolarian.

**deflandrei* W. Wetzel, 1952, p.406, pl.A, fig.12; emend. Sarjeant, 1984c, p.141. Danian. Sarjeant, 1984c, p.141 included this species in the Acritarcha.

"DIMIDIADINIUM" Brideaux, 1977, p.37. Sarjeant, 1982, p.42 retained the type species, *Dimidiadinium dangeardii,* in the genus *Tubotuberella* Vozzhennikova, 1967; emend. Sarjeant, 1982. Sarjeant, *op.cit.* made no reference to *"Dimidiadinium"*, or the other two species in the genus, *D. sphaerocephalis* and *D. uncinatum.* By his actions, Sarjeant, *op.cit.* obviously implied that *Dimidiadinium* was a *jr syn.* of *Tubotuberella.* Davies, 1983, p.23 also regarded *Dimidiadinium* as a *jr syn.* of *Tubotuberella.* Accordingly, Davies, *op.cit.*, p.24, transferred *"Dimidiadinium uncinatum"* to *Tubotuberella.*

*"*dangeardii"* (Sarjeant, 1968) Brideaux, 1977, p.37. NOW and originally *Tubotuberella.* Also formerly *Gonyaulacysta.*

"sphaerocephalis" (Vozzhennikova, 1967) Brideaux, 1977, p.38. NOW and formerly *Tubotuberella.* O.C. According to Sarjeant, 1982, p.32, the specimens illustrated in Vozzhennikova, 1967, pl.103, fig.2,3a-b should be included in the species *Gonyaulacysta eisenackii.* Sarjeant, 1982, p.34, however, stated that the specimen illustrated in Vozzhennikova, 1967, pl.103, fig.3a-b should be included in the species *Gonyaulacysta vozzhennikovae.* Sarjeant, 1982, p.34 also stated that some of the forms illustrated under this name are considered attributable either to *Gonyaulacysta eisenackii* or to *Tubotuberella rhombiformis.* N.I.A.

"uncinatum" (Brideaux, 1977). NOW *Tubotuberella.*

DINGODINIUM Cookson and Eisenack, 1958, p.39; emend. Mehrotra and Sarjeant, 1984b, p.295. The paratabulation as interpreted by Mehrotra and Sarjeant, *op. cit.* is unique to this genus, with the 1a and 3" having a very unusual relationship. The variability in the number of paraplates involved in the formation of the archeopyle is also unusual. See also *Parvocavatus* which is a *jr syn.* of this genus.

"?albertii" Sarjeant, 1966c, p.210-211, pl.21, fig.3; pl.23, fig.1. Sarjeant, *op.cit.* questionably included this species in *Dingodinium*. Considered to be a *jr syn.* of *Dingodinium cerviculum*. See Lentin and Williams, 1981, p.83 and Mehrotra and Sarjeant, 1984b, p.296-298 for discussion.

cerviculum Cookson and Eisenack, 1958, p.40, pl.1, fig.12-14; emend. Mehrotra and Sarjeant, 1984b, p.296-300. Late Neocomian-Aptian. See also *?Dingodinium albertii* which is a *jr syn.* of this species.

cooksoniae Pocock, 1972, p.99, pl.23, fig.9; text-fig.16. Oxfordian-Kimmeridgian. O.C.

europaeum Eisenack, 1958, p.392-393, pl.24, fig.4. Late Aptian.

exiguum Lentin and Williams, 1981, p.84, *nom. subst. pro Dingodinium minutum* Jiabo, 1978, p.87, pl.6, fig.11 *non D. minutum* Dodekova, 1975, p.25, pl.5, fig.13-15. Early Tertiary.

harsveldtii Herngreen *et al.,* 1984, p.8,10-11, pl.1, fig.4-8. Middle Callovian-?Portlandian.

**jurassicum* Cookson and Eisenack, 1958, p.39, pl.1, fig.10-11. Late Jurassic.

magnum Jiabo, 1978, p.87, pl.6, fig.21. Early Tertiary.

minutum Dodekova, 1975, p.25, pl.5, fig.13-15. Late Bathonian.

"minutum" (Jiabo, 1978). *Jr hom.* of *D. minutum* Dodekova, 1975. NOW *Dingodinium exiguum.*

ovatum Jiabo, 1978, p.87, pl.6, fig.18. Early Tertiary.

sanmartinoi Pöthe de Baldis and Ramos, 1983, p.237-238, pl.2, fig.1-2. Early Aptian.

spinosum (Duxbury, 1977, p.46-47, pl.9, fig.3; text-fig.17) Davey, 1979c, p.60. Berriasian; formerly *Parvocavatus.*

tuberosum (Gitmez, 1970, p.307-308, pl.6, fig.9; text-fig.31) Fisher and Riley, 1980, p.319-320. Early Kimmeridgian; formerly *Parvocavatus.*

DINOGYMNIUM Evitt *et al.,* 1967, p.4-8.

***DINOGYMNIUM* (cont'd)**

**acuminatum* Evitt *et al.*, 1967, p.8-16, pl.1&2; pl.3, fig.1-8,10, 12,20; text-fig.11-23. Maastrichtian.

albertii Clarke and Verdier, 1967, p.33, pl.17, fig.3-4; text-fig.13. Santonian.

?amphidoxosum Jiabo, 1978, p.93, pl.6, fig.2. Early Tertiary. Jiabo, *op.cit.* questionably included this species in *Dinogymnium*.

assamicum Jain *et al.*, 1975, p.4, pl.2, fig.28-29. Maastrichtian. Jain, 1977, p.133-134 considered this to be a *jr syn.* of *Dinogymnium sphaerocephalum* as redescribed by Jain, *op.cit.*

avellana (Lejeune-Carpentier, 1951, p.B-309; text-fig.3) Evitt *et al.*, 1967, p.16-17; emend. Lejeune-Carpentier and Sarjeant, 1983, p.10-11. Maastrichtian; formerly *Gymnodinium*. The transfer of this species to *Dinogymnium* is not attributable to Boltenhagen, 1977, p.76. N.I.A.

biconicum Jain and Millepied, 1975, p.136, pl.1, fig.3-4. Campanian-Maastrichtian.

cerviculum Cookson and Eisenack, 1970a, p.138, pl.10, fig.6. Senonian.

cooksoniae Boltenhagen, 1977, p.75-76, pl.11, fig.5-7. Campanian.

cretaceum (Deflandre, 1935, p.225, pl.5, fig.6-8; text-fig.4-5) Evitt *et al.*, 1967, p.17-18. ?Senonian; formerly *Gymnodinium*.

subsp. *undulacostatum* (Boltenhagen, 1977, p.68-69, pl.10, fig.1-5) Lentin and Williams, 1981, p.85. Turonian-Maastrichtian; formerly *Dinogymnium cretaceum* var. *undula-costatum*.

curvatum (Vozzhennikova, 1967, p.43, pl.1, fig.10-12; pl.4, fig.2-3) Lentin and Williams, 1973, p.48. Senonian; formerly *Gymnodinium*. The transfer of this species to *Dinogymnium* is not attributable to Boltenhagen, 1977, p.69.

decorum (Deflandre, 1943, p.503, pl.17, fig.2; text-fig.8-9) Evitt *et al.*, 1967, p.18. Senonian; formerly *Gymnodinium*.

deflandrei Boltenhagen, 1977, p.67-68, pl.9, fig.1-4. Late Senonian.

denticulatum (Alberti, 1961, p.5, pl.3, fig.2-3) Evitt *et al.*, 1967, p.18. Senonian; formerly *Gymnodinium*. Herngreen, 1975, p.63 postulated that this species may be a *sr syn.* of *Dinogymnium undulosum* Cookson and Eisenack. The transfer of this species to *Dinogymnium* is not attributable to Boltenhagen, 1977, p.73.

***DINOGYMNIUM* (cont'd)**

digitus (Deflandre, 1935, p.225, text-fig.7-8) Evitt *et al.*, 1967, p.18-19. Senonian; formerly *Gymnodinium*.

subsp. *crassum* (Vozzhennikova, 1967, p.44, pl.5, fig.3,9-10) Lentin and Williams, 1973, p.49. Turonian; formerly *Gymnodinium digitus* var. *crassum*. O.C.

downiei Boltenhagen, 1977, p.77-78, pl.11, fig.8-10. Campanian-Maastrichtian.

elongatum May, 1977, p.112,114, pl.2, fig.11-12. Late Campanian-Early Maastrichtian.

euclaense Cookson and Eisenack, 1970a, p.139, pl.10, fig.9-12. Senonian.

evittii Boltenhagen, 1977, p.66-67, pl.8, fig.9-11. Senonian.

granulatum Jiabo, 1978, p.94, pl.6, fig.7-8. Early Tertiary.

heterocostatum (Deflandre, 1935, p.225, text-fig.6) Evitt *et al.*, 1967, p.19-20. ?Senonian; formerly *Gymnodinium*.

subsp. *kolpaschevii* (Vozzhennikova, 1967, p.45, pl.3, fig.5) Lentin and Williams, 1973, p.49. Senonian; formerly *Gymnodinium heterocostatum* var. *kolpaschevi*. O.C.

hexagonum (Deflandre-Rigaud, 1954, p.58, text-fig.1-2) Evitt *et al.*, 1967, p.20. Campanian-?Maastrichtian; formerly *Gymnodinium*. Stover and Evitt, 1978, p.38 considered this to be a "problematical species".

hyalinum (Vozzhennikova, 1967, p.45, pl.1, fig.9; pl.2, fig.6; pl.3, fig.4; pl.5, fig.11) Lentin and Williams, 1973, p.49. Senonian; formerly *Gymnodinium*.

kasachstanicum (Vozzhennikova, 1967, p.45-46, pl.2, fig.4a-b; pl.3, fig.9a-b) Lentin and Williams, 1973, p.49. Campanian-Maastrichtian; formerly *Gymnodinium*.

lanceolatum May, 1977, p.115, pl.2, fig.9-10. Late Campanian-Early Maastrichtian.

laticinctum (Deflandre, 1943, p.501, pl.17, fig.3; text-fig.11) Evitt *et al.*, 1967, p.20. ?Senonian; formerly *Gymnodinium*. The transfer of this species is not attributable to Boltenhagen, 1977, p.74.

longicornis (Vozzhennikova, 1967, p.46, pl.1, fig.8; pl.3, fig.6; pl.4, fig.6a-b,7) Harland, 1973, p.678. Senonian; formerly *Gymnodinium*. This predates the same combination by Lentin and Williams, 1973, p.49.

DINOGYMNIUM (cont'd)

majus Jain and Millepied, 1975, p.135-136, pl.1, fig.1-2. Campanian-Maastrichtian.

marthae (Deflandre, 1943, p.500, pl.17, fig.1; text-fig.1-4) Evitt *et al.*, 1967, p.21. Senonian; formerly *Gymnodinium*.

microgranulosum Clarke and Verdier, 1967, p.34-35, pl.5, fig.7-10; text-fig.14. Santonian.

mitratum (Vozzhennikova, 1967, p.40, pl.1, fig.2) Lentin and Williams, 1973, p.49. Turonian-Senonian; formerly *Amphidinium*.

muticum (Vozzhennikova, 1967, p.46-47, pl.1, fig.6-7; pl.2, fig.9) Lentin and Williams, 1973, p.49. Senonian; formerly *Gymnodinium*.

nelsonense (Cookson, 1956, p.183, pl.1, fig.8-11) Evitt *et al.*, 1967, p.21-23. Senonian; formerly *Gymnodinium*.

ovatum Jiabo, 1978, p.94, pl.6, fig.1. Early Tertiary.

pustulicostatum May, 1977, p.115-118, pl.1, fig.1-13; pl.3, fig.1, 3a-b,4a-b. Late Campanian-Early Maastrichtian.

rigaudiae Boltenhagen, 1977, p.73, pl.11, fig.1-4. Campanian-Maastrichtian.

sibiricum (Vozzhennikova, 1967, p.47-48, pl.2, fig.2-3b; pl.3, fig.2-3) Lentin and Williams, 1973, p.50. Senonian; formerly *Gymnodinium*. Since this species was a *nomen nudum* when first erected by Vozzhennikova, 1963, its transfer to *Dinogymnium* by Evitt *et al.*, 1967, p.23 was invalid. Vozzhennikova validated the species in 1967.

sphaerocephalum (Vozzhennikova, 1967, p.48, pl.2, fig.7; pl.3, fig.1) Lentin and Williams, 1973, p.50. Senonian; formerly *Gymnodinium*. Jain, 1977, p.133-134 provided a reinterpreted description of the holotype illustration.

subsp. *laeve* (Vozzhennikova, 1967, p.48, pl.1, fig.4; pl.2, fig.5) Lentin and Williams, 1973, p.50. Senonian; formerly *Gymnodinium sphaerocephalum* var. *laevis*.

strombomorphum (Deflandre, 1943, p.501, pl.17, fig.4-6; text-fig.5-7) Evitt *et al.*, 1967, p.23. ?Senonian; formerly *Gymnodinium*.

undulosum Cookson and Eisenack, 1970a, p.138, pl.10, fig.3. Senonian. See also *Dinogymnium denticulatum*.

vozzhennikovae Lentin and Williams, 1973, p.50, *nom. subst. pro Gymnodinium albertii* Vozzhennikova, 1967, p.41-42, pl.5, fig.7-8 *non Dinogymnium albertii* Clarke and Verdier, 1967, p.33. Turonian.

***DINOGYMNIUM* (cont'd)**

westralium (Cookson and Eisenack, 1958, p.25, pl.1, fig.9) Evitt *et al.*, 1967, p.23-24; emend. May, 1977, p.118. Senonian; formerly *Gymnodinium*.

DINOPTERYGIUM Deflandre, 1935, p.231; emend. Stover and Evitt, 1978, p.204-205. *Oodnadattia* Eisenack and Cookson, 1960, p.6 is a *jr syn*. of this genus; see discussion in Norris and Sarjeant, 1965, p.44. Also Clarke and Verdier, 1967, p.36 listed the type of the genus *Oodnadattia, O. tuberculata,* as a *jr syn*. of *Dinopterygium cladoides:* Stover and Evitt, 1978, p.205 refuted this. See also *Toolongia* which is a *jr syn*. of this genus.

absidatum Drugg, 1978, p.66-67, pl.4, fig.7-9. Callovian-Early Oxfordian.

bicuneatum (Deflandre, 1938b, p.180, pl.8, fig.7) Lentin and Williams, 1981, p.87. Oxfordian. Originally *Palaeoperidinium;* subsequently *Scriniodinium,* then *Glossodinium*.

**cladoides* Deflandre, 1935, p.231, pl.8, fig.6. Senonian.

cooksoniae (Kimyai, 1966, p.471, pl.2, fig.21) Lentin and Williams, 1973, p.50. Cenomanian; formerly *Oodnadattia*. O.C.

"dimorphum" (Ioannides *et al.*, 1977) Drugg, 1978, p.67. This transfer was rejected by Courtinat and Gaillard, 1980, p.30, who retained the species in *Glossodinium*.

fehmarnense (Lentin and Williams, 1973, p.67; description and holotype, Morgenroth, 1966a, p.7, pl.2, fig.7-8) Stover and Evitt, 1978, p.205. Early Eocene; formerly *Heteraulacacysta*. Morgenroth, 1966a included his specimens from the Eocene in *Goniodoma polyedricum* which is a modern motile species. Eisenack and Kjellström, 1971a, p.445 transferred *G. polyedricum* to the fossil genus *Heteraulacacysta,* including all modern forms and Morgenroth's fossil forms. Lentin and Williams, 1973, p.67-68 rejected this transfer on the basis that *Heteraulacacysta* is a fossil cyst genus and erected the species *H. fehmarnensis* for fossil cysts which resemble *Goniodoma polyedricum*. Subsequently, Stover and Evitt, 1978, p.205 transferred the species to *Dinopterygium*.

"medusoides" (Cookson and Eisenack, 1960a, p.14, pl.3, fig.11-12) Stover and Evitt, 1978, p.205. Senonian; formerly *Toolongia*. Yun, 1981, p.71 considered this species to be a *jr syn*. of *Dinopterygium cladoides*.

"perforatum" (Clarke and Verdier, 1967). NOW *Maghrebinia*.

pterophorum (Deflandre and Courteville, 1939, p.102, pl.2, fig.4-5) Lentin and Williams, 1981, p.88. Senonian. Originally *Hystrichosphaeridium;* subsequently *Oodnadattia*.

reticulatum Ch. Singh, 1983, p.156, pl.57, fig.8-10. Early Cenomanian.

***DINOPTERYGIUM* (cont'd)**

tuberculatum (Eisenack and Cookson, 1960, p.6-7, pl.2, fig.10-14; text-fig.1) Stover and Evitt, 1978, p.205. Albian; formerly *Oodnadattia*. Stover and Evitt, *op.cit.* did not agree with Clarke and Verdier, 1967, p.36 that D. *tuberculatum* is a *jr syn.* of *Dinopterygium cladoides*.

"verriculum" (Piasecki, 1980). NOW *Heteraulacacysta*. Lentin and Williams, 1981, p.88 transferred this species from *Dinopterygium* to *Heteraulacacysta*, because it more closely conforms to the diagnosis of the latter genus, as circumscribed by Stover and Evitt, 1978, p.209.

DIOXYA Cookson and Eisenack, 1958, p.59; emend. Morgan, 1977, p.131. Lentin and Williams, 1981, p.88 rejected the contention of Morgan, 1977 that *Vozzhennikovia* is a *jr syn.* of *Dioxya*. The two species of *Dioxya* are morphologically distinct Albian taxa.

**armata* Cookson and Eisenack, 1958, p.59, pl.11, fig.11; text-fig.20; emend. Morgan, 1977, p.131-132. Albian.

"apertura" (Wilson, 1967a) Morgan, 1977, p.131. The transfer of this species to *Dioxya* was rejected by Lentin and Williams, 1981, p.287, who retained it in *Spinidinium*.

"denticulata" (Pöthe de Baldis and Ramos, 1983). NOW *Spinidinium argentinium*.

"extensa" (Stover, 1973) Morgan, 1977, p.131. NOW *Lentinia*. The transfer of this species to *Dioxya* by Morgan, *op.cit.* was rejected by Lentin and Williams, 1981, p.287, who retained the species in *?Vozzhennikovia*.

"filigrana" (Benedek, 1972) Morgan, 1977, p.131. NOW *Phthanoperidinium*. The transfer of this species to *Dioxya* by Morgan, *op.cit.* was rejected by Lentin and Williams, 1981, p.287, who retained the species in *?Vozzhennikovia*.

"rotunda" (Wilson, 1967a) Morgan, 1977, p.131. The transfer of this species to *Dioxya* by Morgan, *op.cit.* was rejected by Lentin and Williams, 1981, p.287 who retained the species in *Vozzhennikovia*.

"tenella" (Morgenroth, 1966b) Morgan, 1977, p.131. NOW *Lejeunecysta*. The transfer of this species to *Dioxya* by Morgan, *op.cit.* was rejected by Lentin and Williams, 1981, p.287 who transferrred the species to *Lejeunecysta*.

"tenera" (Krutzsch, 1962) Morgan, 1977, p.131. NOW *Geiselodinium*. Originally *?Deflandrea*. The transfer of this species to *Dioxya* by Morgan, *op.cit.* was rejected by Lentin and Williams, 1981, p.287 who included the species in *Geiselodinium*.

DIOXYA **(cont'd)**

villosa Eisenack and Cookson, 1960, p.10, pl.2, fig.15-16; emend. Morgan, 1977, p,134,136. Albian. The transfer of this species to *Vozshennikovia* by Stover and Evitt, 1978, p.130 and Burger, 1980a, p.85 was rejected by Lentin and Williams, 1981, p.88.

DIPHASIOSPHAERA Duxbury, 1980, p.115-116.

**stolidota* Duxbury, 1980, p.116-117, pl.1, fig.5,9; text-fig.6. Barremian.

DIPHYES Cookson, 1965a, p.85; emend. Davey and Williams, 1966b, p.95-96. See also *Lingulasphaera* which is a *jr syn.* of this genus.

appendiculare Cookson and Eisenack, 1970a, p.149, pl.13, fig.5. Senonian. O.C.

**colligerum* (Deflandre and Cookson, 1955, p.278, pl.7, fig.3) Cookson, 1965a, p.86-87. Early Eocene. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium.*

cretaceum Yu Jingxian and Zhang Wangping, 1980, p.111, pl.4, fig.1-2. Cenomanian-Early Turonian.

ficusoides Islam, 1983b, p.338, pl.2, fig.9-9. Middle Eocene.

latiusculum Matsuoka, 1974, p.329, pl.44, fig.6. Early-Middle Miocene. O.C.

minus Yu Jingxian and Zhang Wangping, 1980, p.111-112, pl.4, fig.4-5. Cenomanian-Santonian.

"*?monstruosum*" (Tasch, 1964) Davey and Williams, 1969, p.7. NOW *Coronifera;* formerly *Hystrichosphaeridium.* At the time of the transfer, Davey and Williams, *op.cit.* questionably included this species in *Diphyes.*

"*nudum*" (Cookson, 1965a). NOW *Duosphaeridium.*

recurvatum May, 1980, p.50-51, pl.1, fig.18-20. Maastrichtian.

spinulum (Drugg, 1970b, p.817-818, fig.10G,11D-E,12A-B) Stover and Evitt, 1978, p.39. Early Eocene. This was the type of the genus *Lingulasphaera* Drugg, 1970b, which was considered by Stover and Evitt, 1978 to be a *jr syn.* of *Diphyes.*

xinjiangense Yu Jingxian and Zhang Wangping, 1980, p.111, pl.4, fig.3. Cenomanian-Early Turonian.

DIPLOFUSA Cookson and Eisenack, 1960a, p.10. Stover and Evitt, 1978, p.292 considered this to be an acritarch genus.

**gearlensis* Cookson and Eisenack, 1960a, p.10, pl.3, fig.10. Cenomanian.

"DIPLOTESTA" (Cookson and Eisenack, 1960b, non Brongniart, 1874.) NOW *Wallodinium*.

DISCORSIA Duxbury, 1977, p.30.

**nanna* (Davey, 1974, p.59, pl.4, fig.9-10) Duxbury, 1977, p.31. Barremian; formerly *Oligosphaeridium*. This species was emended by Duxbury, *op.cit.* at the time of the transfer.

DISPHAERIA Cookson and Eisenack, 1960a, p.11;, emend. Norvick, 1973, p.45. Norvick in his emendation of *Disphaeria* transferred *Thalassiphora delicata* (Williams and Downie), *Thalassiphora pelagica* (Eisenack), *Thalassiphora reticulata* (Morgenroth), and *Thalassiphora succincta* (Morgenroth) to *Disphaeria*. The transfer of the type species of *Thalassiphora, T. pelagica,* to *Disphaeria* makes the first genus a *jr syn.* of the latter. Norvick stated in his introduction that the type of *Disphaeria, D. macropyla,* has a "possible" archeopyle, whereas Gocht, 1968, p.153, and Gocht, 1969, p.67 and text-figs.46 and 47, demonstrated conclusively that *Thalassiphora pelagica* has a precingular archeopyle resulting from the loss of paraplate 3". *Thalassiphora delicata, T. reticulata,* and *T. succincta* also have been shown to have a precingular archeopyle. In view of the uncertainty concerning the nature of the archeopyle in *Disphaeria,* the transfer of the species *Thalassiphora pelagica, T. delicata, T. reticulata,* and *T. succincta* to *Disphaeria* was rejected by Lentin and Williams, 1977b, p.54. Morgan, 1980, p.22 stated that although he had observed a precingular endoarcheopyle in *Disphaeria,* he preferred to distinguish the genus from *Thalassiphora*. According to Morgan, *op.cit., Disphaeria* has a large dorsal opening in the periphragm which he interpreted as a precingular archeopyle, whereas the periarcheopyle in *Thalassiphora* appears to lack shape or position. Yun, 1981, p.70 regarded *Thalassiphora* as a *jr syn.* of *Disphaeria*. Cookson and Eisenack, 1982, p.56 stated that *Disphaeria* has an apical archeopyle and is characteristic of the Cretaceous, whereas *Thalassiphora* has a precingular archeopyle and is characteristic of the Tertiary.

"balcanica" (Baltes, 1971) Norvick, 1976, p.99. This transfer was rejected by Lentin and Williams, 1977b, p.162 and the species was retained in *Thalassiphora*.

"bononiensis" (Corradini, 1973) Yun, 1981, p.70. The transfer of this species to *Disphaeria* by Yun, *op.cit.* is herein rejected and the species is retained in *Thalassiphora* Eisenack and Gocht.

"defloccata" (Davey and Verdier, 1973) Yun, 1981, p.70. The transfer of this species to *Disphaeria* by Yun, *op.cit.* is herein rejected and the species is retained in *Leberidocysta* Stover and Evitt.

DISPHAERIA (cont'd)

"delicata" (Williams and Downie, 1966c) Norvick, 1973, p.46. The transfer of this species to *Disphaeria* by Norvick, *op.cit.* was rejected by Lentin and Williams, 1977b, p.54 and the species was retained in *Thalassiphora*.

"flammea" (Cookson and Eisenack, 1967b) Yun, 1981, p.70. The transfer of this species to *Disphaeria* by Yun, *op.cit.* is herein rejected and the species is retained in *Thalassiphora* Eisenack and Gocht.

hypoflata Yun, 1981, p.70, pl.9, fig.1-3. Early Santonian.

**macropyla* Cookson and Eisenack, 1960a, p.11, pl.3, fig.13-14; emend. Norvick, 1976, p.99-101. Turonian.

"maxima" (Jain and Millepied, 1975) Yun, 1981, p.70. The transfer of this species to *Disphaeria* by Yun, *op.cit.* is herein rejected and the species is retained in *?Thalassiphora* Eisenack and Gocht.

munda (Davey and Verdier, 1973, p.38, pl.3, fig.5,7,10) Norvick, 1976, p.99. Albian-Cenomanian; formerly *Thalassiphora*. Lentin and Williams, 1981, p. 90 rejected the retention of this species in *Thalassiphora* by Stover and Evitt, 1978, p.230. Yun, 1981, p.70 considered this species to be a *jr syn. of Thalassiphora dynamica* (Morgenroth) Stover and Evitt.

"pelagica" (Eisenack, 1954) Norvick, 1973, p.46. The transfer of this species to *Disphaeria* by Norvick, *op.cit.* was rejected by Lentin and Williams, 1977b, p.54 and the species was retained in *Thalassiphora*.

"petila" (Corradini, 1973) Yun, 1981, p.70. The transfer of this species to *Disphaeria* by Yun, *op.cit.* is herein rejected and the species is retained in *?Thalassiphora* Eisenack and Gocht.

"reticulata" (Morgenroth, 1966b) Norvick, 1973, p.46. The transfer of this species to *Disphaeria* by Norvick, *op.cit.* was rejected by Lentin and Williams, 1977b, p.54 and the species was retained in *Thalassiphora*.

"succincta" (Morgenroth, 1966b) Norvick, 1973, p.46. The transfer of this species to *Disphaeria* by Norvick, *op.cit.* was rejected by Lentin and Williams, 1977b, p.54 and the species was retained in *Thalassiphora*.

"sueroi" (Pöthe de Baldis, 1966) Yun, 1981, p.70. *Jr syn.* of *Thalassiphora pelagica* according to Stover and Evitt, 1978, p.174.

tesselata Srivastava, 1984, p.37, pl.15, fig.1-8. Late Barremian.

"velata" (Deflandre and Cookson, 1955) Yun, 1981, p.70. The transfer of this species to *Disphaeria* by Yun, *op.cit.* is herein rejected and the species is retained in *Thalassiphora* Eisenack and Gocht.

DISPHAEROGENA O. Wetzel, 1933b, p.51. Stover and Evitt, 1978, p.292 suggested that this is possibly a radiolarian.

**carposphaeropsis* O. Wetzel, 1933b, p.51, pl.4, fig.34. Late Cretaceous.

DISSILIODINIUM Drugg, 1978, p.67-68.

**globulum* Drugg, 1978, p.68, pl.4, fig.4-6. Early Kimmeridgian.

DISTATODINIUM Eaton, 1976, p.262-263.

**craterum* Eaton, 1976, p.263-264, pl.9, fig.1-5. Late Eocene.

ellipticum (Cookson, 1965a, p.87, pl.11, fig.1-3a) Eaton, 1976, p.264. Late Eocene. Originally *Hystrichosphaeridium;* subsequently *Tanyosphaeridium.*

"paradoxum" (Brosius, 1963) Eaton, 1976, p.265. NOW *Bipolaribucina.* Originally *Hystrichosphaeridium;* subsequently *Tanyosphaeridium,* then *?Oligosphaeridium.*

parisiense Châteauneuf, 1980, p.137, pl.21, fig.11-12. Late Eocene (Lutetian-Marinesian).

scariosum Liengjarern *et al.,* 1980, p.477,481, pl.54, fig.3. Early Oligocene.

solidum Châteauneuf, 1980, p.137, pl.22, fig.1-2. Late Eocene (Lutetian-Ledian).

tenerum (Benedek, 1972, p.35, pl.10, fig.13-14; text-fig.14) Eaton, 1976, p.263; emend. Benedek and Sarjeant, 1981, p.347-348, fig.1/5 (holotype). Middle Oligocene; formerly *Tanyosphaeridium.*

virgatum Stover, 1977, p.75-76, pl.1, fig.20-21. Early Oligocene.

"DIVERSISPINA" Benson, 1976, p.184. *Jr syn.* of *Kleithriasphaeridium;* see Stover and Evitt, 1978, p.167-168 who transferred the type and single species of the genus, *Diversispina truncata,* to *Kleithriasphaeridium.*

DODEKOVIA Dörhöfer and Davies, 1980, p.26.

gochtii (Dodekova, 1975, p.31, pl.3, fig.8,10-13) Dörhöfer and Davies, 1980, p.26. Late Bathonian; formerly *Tectatodinium.*

**syzygia* Dörhöfer and Davies, 1980, p.26, fig.11,23B,E,H;26A-D, F-G. Toarcian-Bathonian.

"DOIDYX" Sarjeant, 1966c, p.205. *Jr syn.* of *Aptea* Eisenack 1958; emend. Davey and Verdier, 1974 according to Sarjeant and Stover, 1978, p.51. These authors, *op.cit.* transferred the type of the genus *Doidyx, D. anaphrissa,* to *Aptea.* The remaining species *Doidyx granulata* Horowitz, 1975 was transferred to *Cyclonephelium* by Stover and Evitt, 1978, p.36.

DOMASIELLA Eisenack, 1969, p.111. Stover and Evitt, 1978, p.292 considered this to be an acritarch genus.

**discophora* (Cookson and Eisenack, 1962b, p.492, pl.7, fig.17-21) Loeblich and Loeblich, 1970, p.200. Aptian-Albian; formerly *Domasia,* an acritarch.

DOROCYSTA Davey, 1970, p.358.

**litotes* Davey, 1970, p.358-359, pl.5, fig.6-7; text-fig.2A. Cenomanian.

DRACODINIUM Gocht, 1955, p.87; emend. Bujak *et al.*, 1980, p.28. Williams and Downie, 1966b, p.195 transferred the single species of *Dracodinium, D. solidum,* to *Wetzeliella* subgen. *Wetzeliella,* thus making *Dracodinium* a *jr syn.* of *Wetzeliella.* Lentin and Williams, 1976, p.158 also considered *Dracodinium* to be a *jr syn.* of *Wetzeliella.* Costa and Downie, 1979, p.36 retained *Dracodinium* for forms similar to *Wetzeliella* but distinguished by a thick endophragm, reduced apical horn, and a wide endoarcheopyle. Bujak *et al.*, 1980, p.28 also recommended retention of the genus *Dracodinium,* for forms differing from *Wetzeliella* in having a triangular to subtriangular pericyst outline with a single, prominent antapical horn and in lacking a distinct apical horn.

condylos (Williams and Downie, 1966b, p.193-194, pl.20, fig.1-2) Costa and Downie, 1979, p.43. Early Eocene. Originally *Wetzeliella;* subsequently *Rhombodinium.* The transfer of this species from *Wetzeliella* to *Dracodinium* is not attributable to Bujak *et al.*, 1980, p.29. N.I.A.

granulatum (Wilson, 1967c, p.493, fig.29-30) Lentin and Williams, 1981, p.92. Late Eocene. Originally *Wetzeliella (Rhombodinium) glabra* var. *granulata;* subsequently *Rhombodinium glabrum* subsp. *granulatum.*

pachydermum (Caro, 1973, p.365, pl.3, fig.4-6) Costa and Downie, 1979, p.44. Early Eocene; formerly *Wetzeliella.* O.C.

politum Bujak *et al.*, 1980, p.29, pl.11, fig.1. Early Eocene.

subsp. *spinulum* Islam, 1983a, p.236, pl.2, fig.4. Early Eocene.

rhomboideum (Alberti, 1961, p.10, pl.1, fig.1-5; pl.12, fig.9) Costa and Downie, 1979, p.44. Late Eocene. Originally *Wetzeliella (Rhombodinium);* subsequently *Rhombodinium.*

DRACODINIUM (cont'd)

samlandicum (Eisenack, 1954, p.59, pl.8, fig.11-12) Costa and Downie, 1979, p.44. Early Oligocene; formerly *Wetzeliella.*

simile (Eisenack, 1954, p.58-59, pl.8, fig.8-10) Costa and Downie, 1979, p.44. Early Oligocene; formerly *Wetzeliella.*

**solidum* Gocht, 1955, p.88, text-fig.3a-b,4a-c,5a-c. Eocene or Oligocene. See also *Wetzeliella.*

varielongitudum (Williams and Downie, 1966b, p.196-197, pl.20, fig.4,8) Costa and Downie, 1979, p.44. Early Eocene; formerly *Wetzeliella.*

waipawaense (Wilson, 1967c, p.493-494, fig.18,20) Costa and Downie, 1979, p.44. Early Eocene. Originally *Wetzeliella (Rhombodinium);* subsequently *Rhombodinium.*

DRUGGIDIUM Habib, 1973, p.49,51.

**apicopaucicum* Habib, 1973, p.51-52, pl.1, fig.1-3; pl.3, fig.1-3; text-fig.3. Berriasian-Barremian. Habib and Drugg, 1983, p.634 presented an updated paratabulation formula for this species but did not effect an emendation.

deflandrei (Millioud, 1969, p.429-430, pl.2, fig.5-7) Habib, 1973, p.52-53. Barremian; formerly *Microdinium.* This species was emended by Habib at the time of the transfer.

fourmarieri (Lejeune-Carpentier, 1951, p.311, text-fig.7) Lejeune-Carpentier and Sarjeant, 1983, p.2. Senonian; formerly *Phanerodinium.* At the time of the transfer, the species was emended by Lejeune-Carpentier and Sarjeant, 1983, p.2.

jubatum Duxbury, 1980, p.117, pl.3, fig.3-4. Barremian.

laeve (Lejeune-Carpentier, 1951, p.310-311, text-fig.6) Lejeune-Carpentier and Sarjeant, 1983, p.4. Senonian. Originally *Phanerodinium cayeuxi* var. *laeve;* subsequently *Phanerodinium cayeuxi* subsp. *laeve.* This taxon was raised to the subspecies level by Lentin and Williams, 1973, p.112. At the time of the transfer, the species was emended by Lejeune-Carpentier and Sarjeant, 1983, p.4

rhabdoreticulatum Habib, 1973, p.53, pl.2, fig.3-7. Valanginian-Albian.

DUBRIDINIUM Reid, 1977, p.449.

caperatum Reid, 1977, p.451-452, pl.4, fig.38-41,44. Recent. Matsuoka, 1984b, p.2 considered this species to represent the encysted stage of *Diplopeltopsis minor* (Paulsen) Pavillard.

cassiculum Reid, 1977, p.452-453, pl.4, fig.42-43,45. Recent.

DUBRIDINIUM (cont'd)

**cavatum* Reid, 1977, p.449-450, pl.3, fig.35-37. Recent. Matsuoka, 1984b, p.2 considered this species to represent the encysted stage of *Diplopsalopsis orbicularis*.

ulsterum Reid, 1977, p.453-454, pl.4, fig.46-48. Recent.

DUOSPHAERIDIUM Davey and Williams, 1966b, p.97 *ex* Loeblich and Loeblich, 1968, p.211.

**nudum* (Cookson, 1965a, p.87, pl.10, fig.1-4) Loeblich and Loeblich, 1968, p.211. Late Eocene; formerly *Diphyes*.

rugosum Drugg, 1970b, p.816-817, fig.11A-C. Danian.

E

EATONICYSTA Stover and Evitt, 1978, p.41.

*_ursulae_ (Morgenroth, 1966a, p.20, pl.3, fig.11-13) Stover and Evitt, 1978, p.41. Early Eocene. Originally _Cannosphaeropsis;_ subsequently _Membranilarnacia._ See also _Membranilarnacia dictyophora_ and _M. reticulata_ which are _jr synonyms_ of this species.

EGMONTODINIUM Gitmez and Sarjeant, 1972, p.228-229. See Davey, 1979c, p.60 for discussion.

?diminutum Davies, 1983, p.15-16, pl.2, fig.4-8; text-fig.8. Late Bathonian-Oxfordian. Davies, _op.cit._ questionably included this species in _Egmontodinium._

expiratum Davey, 1982b, p.28-29, pl.8, fig.13-16. Portlandian.

ovatum (Gitmez and Sarjeant, 1972, p.237, pl.14, fig.1-3) Riley, 1979, p.221. Kimmeridgian; formerly _?Systematophora._

*_polyplacophorum_ Gitmez and Sarjeant, 1972, p.229-231, pl.8, fig.1-4; pl.9, fig.3; pl.11, fig.5-6,8; text-fig.24. Middle-Late Kimmeridgian.

torynum (Cookson and Eisenack, 1960b, p.252, pl.38, fig.6,15) Davey, 1979c, p.60. Tithonian-Neocomian. Originally _Hystrichosphaeridium;_ subsequently _?Prolixosphaeridium;_ then _Tanyosphaeridium._

EISENACKIA Deflandre and Cookson, 1955, p.258; emend. Sarjeant, 1966b, p.152; emend. McLean, 1973a, p.262.

"circumtabulata" (Drugg, 1967). NOW _Alisocysta._ The transfer of this species to _Hystrichokolpoma_ by Schumacker-Lambry, 1978, p.42 was rejected by Lentin and Williams, 1981, p.94.

*_crassitabulata_ Deflandre and Cookson, 1955, p.258-261, pl.5, fig.2; text-fig. 6-16; emend. McLean, 1973a, p.262. Paleocene-Early Eocene.

"ornata" (Cookson and Eisenack, 1965a). NOW _Alisocysta._

scrobiculata Morgenroth, 1966a, p.12-13, pl.2, fig.12; pl.3, fig.1. Early Eocene. Stover and Evitt, 1978, p.43 considered this to be a "problematical species".

ELLIPSODINIUM Clarke and Verdier, 1967, p.68-69. See also *Dictyopyxidia* which is a *jr syn.* of this genus.

reticulatum Duxbury, 1980, p.117-118, pl.4, fig.4,8. Barremian.

**rugulosum* Clarke and Verdier, 1967, p.69, pl.14, fig.4-6; text-fig.29. Cenomanian-Santonian. This is the same species as *Chelinocysta lita, nom. nud.* Sarjeant, 1967a, p.327.

ELLIPSOIDICTYUM Klement, 1960, p.78.

**cinctum* Klement, 1960, p.78-80, pl.6, fig.15-16; pl.7, fig.1-2; text-fig. 36-37. Middle Oxfordian. *Dictyopyxidia areolata* is a *jr syn.* of *Ellipsoidictyum cinctum;* see discussion under *Dictyopyxidia.*

circulatum (Clarke and Verdier, 1967, p.67-68, pl.1, fig.11; pl.2, fig.3; text-fig.28) Lentin and Williams, 1977b, p.56. Cenomanian-Santonian; formerly *Dictyopyxidia.*

gochtii Fensome, 1979, p.20-22, pl.2, fig.8-9,11-12; text-fig.8. Bajocian-Callovian.

imperfectum (Brideaux and McIntyre, 1975, p.25-26, pl.7, fig.1-5) Lentin and Williams, 1977b, p.56. Early-Middle Albian; formerly *Dictyopyxidia.*

punctatum (Jain, 1977, p.186-187, pl.4, fig.51-52) Below, 1981a, p.47. Early Albian; formerly *Dictyopyxidia.*

reticulatum (Valensi, 1953, p.28, pl.2, fig.4-5,14,19; pl.13, fig.6; text-fig.2d) Lentin and Williams, 1977b, p.56. Bajocian. Originally *Palaeoperidinium;* subsequently *Dictyopyxidia.* The transfer of this species to *Ellipsoidictyum* is not attributable to Sarjeant, 1978, p.18.

ELYTROCYSTA Stover and Evitt, 1978, p.43-44.

**druggii* Stover and Evitt, 1978, p.44. Danian. This species was included in *Membranosphaera maastrichtica* Samoilovich in Drugg, 1967, p.29-30, pl.5, fig.12-13.

EMMETROCYSTA Stover, 1975, p.42.

denticulata He Cheng-quan and Li Peng, 1981, p.63, pl.34, fig.1-5. Late Oligocene.

"*?fibrospinosa*" (Davey and Williams, 1966b) Sarjeant, 1981, p.123. The provisional transfer of this species to *Emmetrocysta* by Sarjeant, *op. cit.* is herein rejected and the species is retained in *Cordosphaeridium.*

***EMMETROCYSTA* (cont'd)**

sarjeantii (Gitmez, 1970, p.291-292, pl.11, fig.4; text-fig.25) Stover and Evitt, 1978, p.45. Early Kimmeridgian; formerly *Polystephanephorus*. Lentin and Williams, 1981, p.149 rejected the transfer of this species to *Hystrichosphaerina* by Duxbury, 1980, p.126.

**urnaformis* (Cookson, 1953, p.118, pl.2, fig.41-43) Stover, 1975, p.42. Oligocene. Originally *Cannosphaeropsis;* subsequently *Polystephanephorus*.

EMSLANDIA Gerlach, 1961, p.171; emend. Benedek and Sarjeant, 1981, p.315-316. Based on re-examination of the holotype of the type species, *E. emslandensis,* Benedek and Sarjeant, 1981, p.315 considered this genus to be separate from *Apteodinium* and rejected the contention of Stover and Evitt, 1978, p.141 that *Emslandia* is a *jr syn.* of *Apteodinium*. The species *Scriniodinium australiense* (now *Apteodinium)* was invalidly transferred to *Emslandia* by Nagy, 1965, p.202.

"australiensis" (Deflandre and Cookson, 1955). This species was invalidly transferred to *Emslandia* by Nagy, 1965, p.202. See *Apteodinium*.

crassimurata Benedek and Sarjeant, 1981, p.320-322, fig.1/2,4 (Benedek, 1972, p.6, pl.3, fig.15 as *E. emslandensis)*. Oligocene.

**emslandensis* Gerlach, 1961, p.172-173, pl.26, fig.13-14; emend. Benedek and Sarjeant, 1981, p.316-318, fig.1/1 (holotype),1/3. Middle Miocene. See also *Apteodinium*.

spiridoides (Benedek, 1972, p.5, pl.2, fig.1; pl.15, fig.1-6) Benedek and Sarjeant, 1981, p.318-320 fig.2/1-3 (holotype). Middle Oligocene; formerly *Apteodinium*.

ENDOCERATIUM Vozzhennikova, 1965, p.89.

dettmanniae (Cookson and Hughes, 1964, p.51-52, pl.7, fig.1-4) Stover and Evitt, 1978, p.45. Late Albian-Early Cenomanian; formerly *Pseudoceratium*.

exquisitum Morgan, 1980, p.22, pl.10, fig.11-12. Early-Late Albian.

**ludbrookiae* (Cookson and Eisenack, 1958, p.52-54, pl.5, fig.7-8) Loeblich and Loeblich, 1966, p.93; emend. Morgan, 1980, p.23. Albian. Originally *Ceratocystidiopsis;* subsequently *Pseudoceratium*. O.C.

pentagonum Ch. Singh, 1983, p.128-129, pl.44, fig.2-3. Middle Cenomanian.

"perforatum" (Vozzhennikova, 1967). NOW *Xenascus*.

turneri (Cookson and Eisenack, 1958, p.55, pl.5, fig.2-6) Stover and Evitt, 1978, p.45. Aptian-Albian; formerly *Pseudoceratium*.

ENDOSCRINIUM (Klement, 1960, p.18) Vozzhennikova, 1967, p.174; formerly *Scriniodinium (Endoscrinium)*. Lentin and Williams, 1981, p.96 rejected the listing of *Endoscrinium* as a *jr syn.* of *Scriniodinium* by Stover and Evitt, 1978, p.187, since the relationship of *Spiniferites* to *Achomosphaera* is analogous and both of these genera are retained by Stover and Evitt, *op.cit.* See also *Athigmatocysta* which is a *jr syn.* of this genus.

amalthei (W. Wetzel, 1966, p.318, pl.31, fig.6) Lentin and Williams, 1981, p.96. Late Pliensbachian. Originally *?Membranilarnacia;* subsequently *Scriniodinium*. The species was emended by Sarjeant, 1980b, p.117-118 when he transferred it from *?Membranilarnacia* to *Scriniodinium*.

anceps Raynaud, 1978, p.392, pl.1, fig.17. Late Kimmeridgian-Valanginian.

bessebae Below, 1981a, p.48-49, pl.7, fig.4-8; pl.14, fig.6-8; text-fig.48-51. Barremian.

campanula (Gocht, 1959, p.61, pl.4, fig.6; pl.5, fig.1) Vozzhennikova, 1967, p.175. Hauterivian; formerly *Scriniodinium*. The retention of this species in *?Scriniodinium* by Stover and Evitt, 1978, p.187 was rejected by Lentin and Williams, 1981, p.96. N.I.A. See also *Gonyaulacysta fragosa* which is a *jr syn.* of this species.

subsp. *nichan* Below, 1981a, p.50-51, pl.7, fig.2. Hauterivian.

"eisenackii" (Deflandre, 1938b) Gocht, 1970b, p.146-147. NOW and formerly *Gonyaulacysta*. Originally *Gonyaulax*. See also *Tubotuberella*.

subsp. *"oligodentatum"* (Cookson and Eisenack, 1958) Gocht, 1970b, p.146. See *"Tubotuberella eisenackii* subsp. *oligodentata."* O.C.

**galeritum* (Deflandre, 1938b, p.167, pl.5, fig.7-9; text-fig.1) Vozzhennikova, 1967, p.176. Oxfordian. Originally *Gymnodinium;* subsequently *Scriniodinium*. The retention of this species in *Scriniodinium* by Stover and Evitt, 1978, p.187 was rejected by Lentin and Williams, 1981, p.96.

subsp. *fornicatum* (Klement, 1960, p.25-26, pl.1, fig.7-12) Lentin and Williams, 1973, p.54. Middle Oxfordian; formerly *Scriniodinium galeritum* subsp. *fornicatum*. The retention of this subspecies in *Scriniodinium* by Stover and Evitt, 1978, p.187 was rejected by Lentin and Williams, 1981, p.96.

subsp. *galeritum* ((Deflandre, 1938b, p.167, pl.5, fig.7-9; text-fig.1) Vozzhennikova, 1967, p.176-177. Oxfordian; formerly *Scriniodinium galeritum* subsp. *galeritum*. The retention of this subspecies in *Scriniodinium* by Stover and Evitt, 1978, p.187 was rejected by Lentin and Williams, 1981, p.97.

ENDOSCRINIUM *galeritum* (cont'd)

subsp. *reticulatum* (Klement, 1960, p.26-27, pl.2, fig.1-2) Lentin and Williams, 1973, p.54. Middle Oxfordian; formerly *Scriniodinium galeritum* subsp. *reticulatum*. The retention of this subspecies in *Scriniodinium* by Stover and Evitt, 1978, p.187 was rejected by Lentin and Williams, 1981, p.97. According to Sarjeant, 1984a, p.155, the holotype of this subspecies has disintegrated.

glabrum Duxbury, 1977, p.24, pl.11, fig.1,6; text-fig.3) Below, 1981a, p.48. Berriasian-Barremian; formerly *Athigmatocysta*.

gochtii (Pocock, 1972, p.90, pl.22, fig.12; text-fig.6) Muir and Sarjeant, 1978, p.205. Late Bajocian; formerly *Scriniodinium*. Sarjeant, 1978, p.29 also transferred this species to *Endoscrinium*.

granulatum (Raynaud, 1978, p.391, pl.2, fig.6,12) Lentin and Williams, 1981, p.97. Late Kimmeridgian-Portlandian; formerly *Athigmatocysta*.

klementii (Pocock, 1972, p.91, pl.23, fig.1-2; text-fig.7) Sarjeant, 1978, p.29. Callovian; formerly *Scriniodinium*.

"luridum" (Deflandre, 1938b) Gocht, 1970b, p.144-146. NOW *Tubotuberella*.

"oxfordianum" (Sarjeant, 1962a) Vozzhennikova, 1967, p.177. NOW *Sirmiodinium*; formerly *Scriniodinium*.

pharo Duxbury, 1977, p.32, pl.9, fig.5; text-fig.8. Berriasian-Valanginian. The transfer of this species to *Scriniodinium* by Davey, 1982b, p.31 is herein rejected.

rostratum (Brideaux and McIntyre, 1975, p.33-34, pl.10, fig.6-14; pl.11, fig. 1-3) Below, 1981a, p.51. Middle Albian; formerly *Scriniodinium*.

subvallare (Sarjeant, 1962b, p.262-263, pl.1, fig.10; text-fig.7) Lentin and Williams, 1973, p.54. Late Oxfordian; formerly *Scriniodinium*. The retention of this species in *Scriniodinium* by Stover and Evitt, 1978, p.187 was rejected by Lentin and Williams, 1981, p.97.

ENERGLYNIA Sarjeant, 1976b, p.164. Riley and Fenton, 1982, p.199-200 considered this genus to be a *jr syn.* of *Wanaea;* this is herein rejected on the basis of the emendation of the genus *Wanaea* by Fensome, 1981.

**acollaris* (Dodekova, 1975, p.20-21, pl.2, fig.9-10; pl.3, fig.1-7, 9; text-fig.2) Sarjeant, 1978, p.14. Late Bathonian; formerly *Wanaea*. The original type of the genus *Energlynia, E. kyrbasia,* was considered to be a *jr syn.* of *E. acollaris* by Fensome, 1981, p.50 and Fenton and Fisher, 1978, p.236; the latter species therefore becomes the type of the genus. See also *Wanaea zoharensis* which is a *jr syn.* of this species.

ENERGLYNIA (cont'd)

"indotata" (Drugg, 1978, p.74-75, pl.8, fig.11-14) Fensome, 1981, p.51. Bajocian-Callovian; formerly *Wanaea*. Riley and Fenton, 1982, p.200 considered this species to be a *jr syn.* of *Energlynia acollaris* (as *Wanaea)*. Woollam, 1980, p.250 considered this species (as *Wanaea indotata)* to be a *jr syn.* of *Energlynia acollaris*.

"kyrbasia" Sarjeant, 1976b, p.166,168,170,172, fig.1-16. Late Bathonian. This species, the original type of the genus, was considered to be a *jr syn.* of *Energlynia acollaris* (Dodekova, 1975) Sarjeant, 1978, by Fenton and Fisher, 1978, p.236 and Fensome, 1981, p.50. *Energlynia acollaris* therefore becomes the type of the genus.

EOCLADOPYXIS Morgenroth, 1966a, p.7; emend. Stover and Evitt, 1978, p.206-207.

**peniculata* Morgenroth, 1966a, p.7-8, pl.3, fig.2-3. Early Eocene. See McLean, 1976, p.348 for revised description. O.C.

tessellata Liengjarern *et al.*, 1980, p.481-482, pl.53, fig.6. Late Eocene.

EODINIA Eisenack, 1936, p.73; emend. Gocht, 1975a, p.27.

**pachytheca* Eisenack, 1936, p.73, text-fig.1-6; emend. Gocht, 1975a, p.27. Callovian.

"EOPSEUDOCERATIUM" (Neale and Sarjeant, 1962, p.446) Lentin and Williams, 1973, p.54. Formerly *Pseudoceratium* subgenus *Eopseudoceratium*. *Jr syn.* of *Pseudoceratium*. Lentin and Williams, 1981, p.98 did not accept the opinion of Stover and Evitt, 1978, p.77 that *Eopseudoceratium* is a *jr syn.* of *Pseudoceratium*. Below, 1981a, p.118,120 also considered this genus to be a *jr syn.* of *Pseudoceratium*. We herein accept the opinions of Stover and Evitt, 1978 and Below, 1981a.

*"*gochtii"* (Neale and Sarjeant, 1962). NOW *Pseudoceratium*. O.C.

EPELIDOSPHAERIDIA Davey, 1969a, p.142.

"aspera" (Ch. Singh, 1971) Morgan, 1980, p.23. We do not agree with Morgan, *op.cit.* that the genus *Epelidosphaeridia* is characterized by "an even cover of short spines". Accordingly, we reject this transfer and retain the species in *Cyclonephelium*.

colligata (Morgan, 1980) *comb. nov.*
1980 *Tenua colligata* Morgan, p.32, pl.29, fig.6-11. Aptian-Early Albian. Formerly *Tenua*.

pentagona Morgan, 1980, p.23, pl.12, fig.11-15. Early-Late Albian.

EPELIDOSPHAERIDIA **(cont'd)**

**spinosa* (Cookson and Hughes, 1964, p.49, pl.8, fig.6-8) Davey, 1969a, p.143. Early Cenomanian; formerly *Palaeoperidinium*.

EPICEPHALOPYXIS Deflandre, 1935, p.234.

**adhaerens* Deflandre, 1935, p.234, pl.9, fig.5-6. Late Cretaceous.

"*indentata*" (Deflandre and Cookson, 1955). NOW *Paralecaniella*, which was questionably included in the *Chlorophyta* by Cookson and Eisenack, 1970b, p.323. Elsik, 1977, p.96 considered *Paralecaniella* to be a dinoflagellate.

"*spectabilis*" (Deflandre and Cookson, 1955). NOW *Wanaea*.

EPIPLOSPHAERA Klement, 1960, p.73.

"*areolata*" (Klement, 1960). NOW *?Lithodinia*.

**bireticulata* Klement, 1960, p.74-75, pl.8, fig.1-4. Early Kimmeridgian.

reticulospinosa Klement, 1960, p.75-76, pl.8, fig.10-12. Early Kimmeridgian.

"*ERIKANIA*" Morgenroth, 1966a, p.27. *Jr syn.* of *Thalassiphora* according to Stover and Evitt, 1978, p.194. These authors (p.195) transferred the type of the genus, *Erikania dynamica*, to *Thalassiphora*.

ESCHARISPHAERIDIA Erkmen and Sarjeant, 1980, p.62-63.

"*dictydia*" (Sarjeant, 1972) Erkmen and Sarjeant, 1980, p.63. NOW *Cassiculosphaeridia*. Originally *Chytroeisphaeridia;* subsequently *Batiacasphaera*.

**pocockii* (Sarjeant, 1968, p.230, pl.3, fig.9) Erkmen and Sarjeant, 1980, p.62. Late Callovian. Originally *Chytroeisphaeridia;* subsequently *Lithodinia*.

rudis Davies, 1983, p.28, pl.10, fig.7,10-18; text-fig.25. Late Callovian-Valanginian.

EUCLADINIUM Stover and Evitt, 1978, p.104.

gambangense (Cookson and Eisenack, 1970a, p.140, pl.11, fig.1-2) Stover and Evitt, 1978, p.104. Senonian. Originally *Deflandrea;* subsequently *Isabelia*, then *Isabelidinium*.

**madurense* (Cookson and Eisenack, 1970a, p.140, pl.11, fig.3-4) Stover and Evitt, 1978, p.104. Senonian. Originally *Deflandrea;* subsequently *Isabelia*, then *Isabelidinium*.

EUCLADINIUM **(cont'd)**

spinosissimum (Cookson and Eisenack, 1970a, p.141, pl.11, fig.5-6) Stover and Evitt, 1978, p.104. Senonian. Originally *Deflandrea;* subsequently *Isabelia,* then *Isabelidinium.*

EURYDINIUM Stover and Evitt, 1978, p.104-105.

"conoratum" (Stover, 1974) Stover and Evitt, 1978, p.105. NOW *Manumiella.* Originally *Deflandrea;* subsequently *Isabelia,* then *Isabelidinium.*

euthemum (Davey and Verdier, 1971, p.40, pl.3, fig.1-3) Stover and Evitt, 1978, p.105. Middle-Late Albian. Originally *Deflandrea;* subsequently *?Subtilisphaera.*

eyrense (Cookson and Eisenack, 1971, p.217-218, pl.7, fig.2-3) Stover and Evitt, 1978, p.105. Albian-Cenomanian. Originally *Deflandrea;* subsequently *Alterbia.*

glomeratum (Davey, 1970, p.343-344, pl.1, fig.7-9) Stover and Evitt, 1978, p.105. Cenomanian. Originally *Deflandrea;* subsequently *Isabelia,* then *Isabelidinium.*

**ingramii* (Cookson and Eisenack, 1970a, p.143, pl.12, fig.7-9) Stover and Evitt, 1978, p.105. Albian-Cenomanian. Originally *Deflandrea;* subsequently *Alterbia.* See also *Senegalinium ingramii.*

"raijae" (Kjellström, 1973) Stover and Evitt, 1978, p.105. NOW *Manumiella.* Originally *Deflandrea;* subsequently *Alterbia.*

EVANSIA Pocock, 1972, p.95.

?erregulensis Filatoff, 1975, p.90, pl.29, fig.12-14. Bajocian. Stover and Evitt, 1978, p.230 considered this to be a "provisionally accepted species".

**granulata* Pocock, 1972, p.95, pl.24, fig.7; text-fig.12. Late Bajocian.

"EVITTIA" Pocock, 1972, p.93. *Jr hom.* of the acritarch genus *Evittia* Brito, 1967, p.477. See *Pocockia nom. subst.*

"EVITTODINIUM" Deflandre, 1964, p.5030. Lentin and Williams, 1976, p.159, following the observations of Evitt (personal communication), considered *Evittodinium* to be a *nomen dubium.* Lentin and Williams, 1981, p.100 did not concur with Stover and Evitt, 1978, p.105 who retained this genus.

*"*giselae"* Deflandre, 1964, p.5030, fig.1-5. Senonian. Lentin and Williams, 1976, p.159 considered this species to be a *nomen dubium.*

EVITTOSPHAERULA Manum, 1979, p.242-243.

**paratabulata* Manum, 1979, p.243,246, pl.2, fig.1-12; text-fig.3-4. Middle Oligocene-Early Miocene.

EXIGUISPHAERA Duxbury, 1979a, p.198-199. See also discussion in Duxbury, 1980, p.118 concerning the apparent similarity of this genus to *Diacanthum*.

**phragma* Duxbury, 1979a, p.199, pl.2, fig.2-3,5; text-fig.1-2. Early Hauterivian.

plectilis Duxbury, 1980, p.118-119, pl.3, fig.5,8,11. Barremian.

EXOCHOSPHAERIDIUM Davey *et al.*, 1966, p.165.

arnace Davey and Verdier, 1973, p.184-185, pl.1, fig.3,6. Late Albian-Early Cenomanian.

bifidum (Clarke and Verdier, 1967, p.72, pl.17, fig.5-6; text-fig.30) Clarke *et al.*, 1968, p.182. Cenomanian-Campanian; formerly *Baltisphaeridium*.

subsp. *involutum* (Davey, 1969c, p.29, pl.2, fig.1-3) Lentin and Williams, 1973, p.56. Campanian-Maastrichtian; formerly *Exochosphaeridium bifidum* var. *involutum*.

"*?brevispinum*" (Norvick, 1976). NOW *Pervosphaeridium*. Stover and Evitt, 1978, p.154 considered this to be a "provisionally accepted species" of *Exochosphaeridium*.

brevispinosum Matsuoka, 1984a, p.381, pl.72, fig.6-9. Middle Eocene.

?caputmedusae Cookson and Eisenack, 1974, p.68, pl.25, fig.16. Senonian. Stover and Evitt, 1978, p.154 considered this to be a "provisionally accepted species".

"*?cenomaniense*" (Norvick, 1976). NOW *Pervosphaeridium*. Stover and Evitt, 1978, p.154 considered this to be a "provisionally accepted species" of *Exochosphaeridium*.

?indicum Jain and Taugourdeau-Lantz, 1973, p.63, pl.3, fig.7. Early Cretaceous. Stover and Evitt, 1978, p.154 considered this to be a "provisionally accepted species".

longifilum Cookson and Eisenack, 1982, p.44, pl.8, fig.13. Latest Turonian-Coniacian.

muelleri Yun, 1981, p.25-26, pl.4, fig.12,14-15; pl.5, fig.9,11. Early Santonian.

EXOCHOSPHAERIDIUM (cont'd)

"?palmatum" (Deflandre and Courteville, 1939, p.101, pl.3, fig.1) Davey *et al.*, 1969, p.16. Late Cretaceous. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium.* Stover and Evitt, 1978, p.154 considered this to be a "provisionally accepted species" of *Exochosphaeridium.* Yun, 1981, p.29 considered this species to be a *jr syn.* of the species *Pervosphaeridium pseudhystrichodinium* (Deflandre) Yun.

**phragmites* Davey *et al.*, 1966, p.165-166, pl.2, fig.8-10.

"?pseudhystrichodinium" (Deflandre, 1937b) Davey *et al.*, 1969, p.16-17. NOW *Pervosphaeridium.* Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium.* At the time of the transfer, Davey *et al.*, *op.cit.* questionably included this species in *Exochosphaeridium.* Stover and Evitt, 1978, p.154 considered this to be a "provisionally accepted species" of *Exochosphaeridium.*

reticulatum Matsuoka, 1984a, p.380-381, pl.72, fig.1-5. Middle Eocene.

rhopalophorum (Valensi, 1955a) *comb. nov.*
1955a *Hystrichosphaeridium rhopalophorum* Valensi, p.36, fig.1C. Late Cretaceous.

scitulum Ch. Singh, 1971, p.346-347, pl.57, fig.8-9. Middle Albian.

?solaster (Morgenroth, 1966a, p.25, pl.5, fig.8-9) Stover and Evitt, 1978, p.154. Early Eocene; formerly *Cordosphaeridium.* Stover and Evitt, 1978, p.154 considered this to be a "provisionally accepted species".

?spinosum (White, 1842, p.237, pl.4, fig.6) Davey 1969a, p.166. Late Cretaceous. Originally *Xanthidium;* subsequently *Hystrichosphaeridium,* then *Baltisphaeridium.* Stover and Evitt, 1978, p.154 considered this to be a "provisionally accepted species".

subsp. *"deflandrei"* (Lejeune-Carpentier, 1941) Lentin and Williams, 1973, p.56. NOW *?Fibrocysta deflandrei.* Originally *Hystrichosphaeridium spinosum* var. *deflandrei;* subsequently *Baltisphaeridium spinosum* var. *deflandrei;* then *Exochosphaeridium spinosum* var. *deflandrei,* then *Exochosphaeridium spinosum* subsp. *deflandrei.*

"striolatum" ((Deflandre, 1937b) Davey, 1969a, p.164. NOW *Coronifera.* Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium.*

subsp. *"truncatum"* (Davey, 1969a) Lentin and Williams, 1973, p.56. NOW *Pervosphaeridium truncatum;* formerly *Exochosphaeridium striolatum* var. *truncatum.* See also *Exochosphaeridium truncatum.* This taxon was raised to the species level by Stover and Evitt, 1978, p.154.

EXOCHOSPHAERIDIUM (cont'd)

"?truncatum" (Davey, 1969a) Stover and Evitt, 1978, p.154. NOW *Pervosphaeridium*. Originally *Exochosphaeridium striolatum* var. *truncatum;* subsequently *Exochosphaeridium striolatum* subsp. *truncatum*. At the time of the transfer, Stover and Evitt, *op.cit.* questionably included this species in *Exochosphaeridium*.

"truncigerum" (Deflandre, 1937b) Davey, 1978, p.894. NOW *Pervosphaeridium*. The transfer of this species to *Exochosphaeridium* was rejected by Lentin and Williams, 1981, p.58 who retained the species in *Cordosphaeridium*.

EYACHIA Gocht, 1979, p.307-308.

**prisca* Gocht, 1979, p.308,310,312-317, fig.1-10. Aalenian.

F

"FACETODINIUM" Bjaerke, 1980, p.69. This genus is herein considered a *jr syn.* of *Susadinium.*

"**faustum*" (Bjaerke, 1980). NOW *Susadinium.*

"*inflatum*" (Bjaerke, 1980). NOW *Susadinium.*

"FAVILARNAX" Sarjeant, 1963a, p.720. *Jr syn.* of *Valensiella;* see Sarjeant, 1964a, p.172-173, and Loeblich and Loeblich, 1966, p.30.

FIBRADINIUM Morgenroth, 1968, p.537-538.

**annetorpense* Morgenroth, 1968, p.538, pl.42, fig.4-7; text-fig.1-2. Danian.

FIBROCYSTA Stover and Evitt, 1978, p.155.

acornuta Norris and Jux, 1984, p.161-162, pl.1, fig.17-20; pl.2, fig.1-4; pl.3, fig.5; pl.5, fig.1-6. Late Kimmeridgian-Late Tithonian.

axialis (Eisenack, 1965, p.150, pl.6, fig.4-5) Stover and Evitt, 1978, p.155. Late Eocene-Early Oligocene. Originally *Cordosphaeridium;* subsequently *Lanternosphaeridium.* See also *Amphorosphaeridium.*

**bipolaris* (Cookson and Eisenack, 1965b, p.135, pl.16, fig.7-8) Stover and Evitt, 1978, p.155. Early Eocene. Originally *Cordosphaeridium;* subsequently *Lanternosphaeridium,* then *Amphorosphaeridium.*

?cincta (Cookson and Eisenack, 1982) *comb. nov.*
1982 *Lanternosphaeridium cinctum* Cookson and Eisenack, p.45, pl.2, fig.22. Albian-Cenomanian. We questionably assign this species to the genus *Exochosphaeridium.*

?deflandrei (Lejeune-Carpentier, 1941, p.84, fig.6) emend. Lejeune-Carpentier and Sarjeant, 1981, p.14. Late Cretaceous. Originally *Hystrichosphaeridium spinosum* var. *deflandrei;* subsequently *Baltisphaeridium spinosum* var. *deflandrei,* then *Exochosphaeridium spinosum* var. *deflandrei,* then *Exochosphaeridium spinosum* subsp. *deflandrei.* At the time of the transfer, Lejeune-Carpentier and Sarjeant, *op.cit.* questionably included this species in *Fibrocysta.*

FIBROCYSTA (cont'd)

exiguapicis Islam, 1983b, p.338-339, pl.2, fig.10-11. Early Eocene.

?fusiforma Edwards, 1984, p.585, pl.4, fig.2-3a-b. Late Miocene. Edwards, *op.cit.* questionably included this species in *Fibrocysta*.

klumppiae (Corradini, 1973, p.152, pl.22, fig.2a-c) Stover and Evitt, 1978, p.155. Late Cretaceous-Paleocene; formerly *Cordosphaeridium*.

lappacea (Drugg, 1970b, p.812-813, fig.4A-D,5A-D) Stover and Evitt, 1978, p.155. Early Eocene; formerly *Lanternosphaeridium*.

licia (Jain *et al.*, 1975, p.10, pl.4, fig.51-53) Stover and Evitt, 1978, p.155. Danian; formerly *Lanternosphaeridium*.

morgenrothii (Corradini, 1973, p.155, pl.23, fig.1) Stover and Evitt, 1978, p.155. Senonian; formerly *Lanternosphaeridium*.

?mutinensis (Corradini, 1973, p.155-156, pl.23, fig.2,9; pl.34, fig.2,3a-b) Stover and Evitt, 1978, p.155. Senonian; formerly *Lanternosphaeridium*. Stover and Evitt, 1978, p.155 considered this to be a "provisionally accepted species".

ovalis (Hansen, 1977, p.17, fig.19F-G) Lentin and Williams, 1981, p.103. Maastrichtian-Danian; formerly *Lanternosphaeridium*.

radiata (Morgenroth, 1966a, p.37-38, pl.10, fig.7-9) Stover and Evitt, 1978, p.155. Early Eocene; formerly *Lanternosphaeridium*.

vectensis (Eaton, 1976, p.275-276, pl.12, fig.4-6) Stover and Evitt, 1978, p.155. Middle-Late Eocene; formerly *Lanternosphaeridium*.

subsp. *cymosapicis* Islam, 1983c, p.85-86, pl.3, fig.6-7. Middle Eocene.

FILISPHAERA Bujak, 1984, p.185.

**filifera* Bujak, 1984, p.185, pl.1, fig.7-12. Late Miocene-Early Pleistocene.

FLORENTINIA Davey and Verdier, 1973, p.185-186; emend. Duxbury, 1980, p.119. Lentin and Williams, 1981, p.1 rejected the contention of Duxbury, 1980, p.119 that *Achilleodinium* Eaton is a *jr syn.* of *Florentinia*.

abjuncta Duxbury, 1983, p.46-47, pl.6, fig.9-10. Early Aptian.

berran Below, 1982c, p.7, pl.5, fig.1-4. Cenomanian.

"biformoides" (Eisenack, 1954) Duxbury, 1980, p.121. NOW *Achilleodinium*.

buspina (Davey and Verdier, 1976, p.321-322, pl.2, fig.1-6; text-fig.3) Duxbury, 1980, p.121. Senonian; formerly *Silicisphaera*.

***FLORENTINIA* (cont'd)**

causea Yu Jingxian and Zhang Wangping, 1980, p.113, pl.4, fig.9-10. Late Cretaceous.

clavigera (Deflandre, 1937b, p.71, pl.11, fig.1-2) Davey and Verdier, 1973, p.192; emend. Davey and Verdier, 1976, p.315. Senonian. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium,* then *Hystrichosphaera,* then *Hystrichokolpoma.*

cooksoniae (Ch. Singh, 1971, p.329-330, pl.51, fig.7-8; pl.52, fig.1-4) Duxbury, 1980, p.120. Late Albian; formerly *Hystrichosphaeridium.* The species was emended by Duxbury at the time of the transfer. We herein reject the contention of Below, 1982c, p.8 that this species is a *jr syn.* of *Florentinia mantellii.* The transfer of this species to *Litosphaeridium* by Yu Jingxian and Zhang Wangping, 1980, p.112 is herein rejected, because the archeopyle in that genus is apical.

deanei (Davey and Williams, 1966b, p.58, pl.6, fig.4,8) Davey and Verdier, 1973, p.187. Cenomanian; formerly *Hystrichosphaeridium.*

ferox (Deflandre, 1937b, p.72, pl.11, fig.3-4) Duxbury, 1980, p.121. Senonian. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium,* then *Hystrichokolpoma,* then *Silicisphaera.*

?flosculus (Deflandre, 1937b, p.75, pl.15, fig.5-6) Lentin and Williams, 1981, p.104. Senonian. Originally *Hystrichosphaeridium;* subsequently *?Litosphaeridium,* then *?Silicisphaera.* At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Florentinia.*

hypomagna Yun, 1981, p.51-52, pl.6, fig.6,9-10; text-fig.14. Early Santonian.

interrupta Duxbury, 1980, p.121, pl.12, fig.3; text-fig.8. Barremian.

khaldunii Below, 1982c, p.7-8, pl.4, fig.11-12. Aptian-Albian.

**laciniata* Davey and Verdier, 1973, p.186-187, pl.2, fig.1,3-4,6-7,9. Late Albian-Early Cenomanian.

subsp. *seghiris* Below, 1982c, p.8, pl.4, fig.5,7. Cenomanian.

mantellii (Davey and Williams, 1966b, p.66, pl.6, fig.6) Davey and Verdier, 1973, p.191. Late Cenomanian; formerly *Hystrichosphaeridium.*

miscella Yun, 1981, p.49-51, pl.6, fig.7,13-14; pl.8, fig.15; text-fig.13. Early Santonian.

radiculata (Davey and Williams, 1966b, p.65, pl.7, fig.9; pl.9, fig.6) Davey and Verdier, 1973, p.191; emend. Davey and Verdier, 1976, p.318. Late Cenomanian; formerly *Hystrichosphaeridium.*

FLORENTINIA (cont'd)

ramulus (May, 1980, p.66-67, pl.2, fig.13-16) Lentin and Williams, 1981, p.105. Maastrichtian; formerly *Silicisphaera*.

resex Davey and Verdier, 1976, p.319-320, pl.4, fig.1-3; text-fig.2. Turonian.

"stellata" (Maier, 1959) Below, 1982a, p.10. In his restudy of the holotype of this species, Sarjeant, 1983, p.104 concluded that *Florentinia stellata* is a *jr syn.* of *Hystrichokolpoma rigaudiae*. For full citation see *?Hystrichosphaeridium stellatum*.

tenera (Davey and Verdier, 1976, p.326-327, pl.3, fig.8-12; text-fig.6) Duxbury, 1980, p.122. Senonian; formerly *Silicisphaera*.

?torulosa (Davey and Verdier, 1976, p.328, pl.4, fig.10-12) Lentin and Williams, 1981, p.105. Turonian. Formerly *Silicisphaera*. At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Florentinia*.

tridactylites (Valensi, 1955a, p.37, fig.1D) Duxbury, 1980, p.122. Cretaceous. Originally *Hystrichosphaeridium*; subsequently *Baltisphaeridium*, then *Achomosphaera*, then *Silicisphaera*.

"truncigera" (Deflandre, 1937b) Below, 1982c, p.10. NOW *Pervosphaeridium*. Originally *Hystrichosphaeridium*.

verdieri Ch. Singh, 1983, p.149, pl.53, fig.5-10; pl.54, fig.1-2. Cenomanian.

FROMEA Cookson and Eisenack, 1958, p.55; emend. Yun, 1981, p.55-56. Duxbury, 1980, p.134 considered this to be an acritarch genus.

"acambra" (Sah *et al.*, 1970). NOW *Palaeostomocystis*.

**amphora* Cookson and Eisenack, 1958, p.56, pl.5, fig.10-11. Albian-Cenomanian. See also *Fromea warlinghamensis* which is a *jr syn.* of this species.

?apiculata (Cookson and Eisenack, 1960a, p.12, pl.3, fig.15) Stover and Evitt, 1978, p.48. Santonian-Campanian; formerly *Palaeostomocystis*. Stover and Evitt, 1978, p.48 considered this to be a "provisionally accepted species".

atlantica (Habib, 1972, p.375, pl.4, fig.2,5) Davies, 1983, p.31. Callovian-Oxfordian. Originally *Tenua;* subsequently *?Sentusidinium*.

chytra (Drugg, 1967, p.35, pl.6, fig.12) Stover and Evitt, 1978, p.48. Maastrichtian-Danian; formerly *Palaeostomocystis*.

complicata Brideaux, 1977, p.18-19, pl.7, fig.1-6. Aptian-Albian. Davies, 1983, p.31 considered this to be a *jr syn.* of *Fromea atlantica*.

FROMEA (cont'd)

?cylindrica (Cookson and Eisenack, 1960b, p.258, pl.39, fig.16) Stover and Evitt, 1978, p.48. Late Jurassic-Neocomian; formerly *Palaeostomocystis*. Stover and Evitt, 1978, p.48 considered this to be a "provisionally accepted species".

"?elongata" (Beju, 1971). NOW *Wallodinium;* see also *Palaeostomocystis*. This species and others that appeared in 1969 in a privately circulated manuscript by Beju were listed as *nom. nud.* by Lentin and Williams, 1973. Unfortunately, these authors were not aware of Beju, 1971, in which the species were validly published. Stover and Evitt, 1978, p.48 considered this to be a "provisionally accepted species" of *Fromea*.

"elongata" (Jain and Millepied, 1975). *Jr hom.* of *F. elongata* Beju, 1971. NOW *Fromea granulata.*

expolita (Brideaux, 1977, p.20, pl.7, fig.12-14) Lentin and Williams, 1981, p.105. Barremian; formerly *Palaeostomocystis*.

fragilis (Cookson and Eisenack, 1962b, p.496-497, pl.7, fig.10-11) Stover and Evitt, 1978, p.48. Aptian-Cenomanian; formerly *Palaeostomocystis*.

glabella (Ch. Singh, 1971, p.428-429, pl.80, fig.4) Lentin and Williams, 1981, p.106. Late Albian; formerly *Palaeostomocystis*.

granulata Lentin and Williams, 1977b, p.61 *nom. subst. pro F. elongata* Jain and Millepied, 1975 (p.141, pl.2, fig.29-30; holotype fig.30) *non F. elongata* Beju, 1971, p.289-290. Aptian-Albian. The *nom. subst.*, *F. senegalensis* Jain and Millepied, 1977, p.284, postdates the Lentin and Williams name by one month.

granulosa (Cookson and Eisenack, 1974, p.79, pl.28, fig.10) Stover and Evitt, 1978, p.48. Albian-Cenomanian; formerly *Palaeostomocystis*.

irregularis Courtinat *in* Courtinat and Gaillard, 1980, p.27-28, pl.3, fig.8. Late Oxfordian.

?laevigata (Drugg, 1967, p.35, pl.6, fig.14-15) Stover and Evitt, 1978, p.48. Maastrichtian-Danian; formerly *Palaeostomocystis*. Stover and Evitt, 1978, p.48 considered this to be a "provisionally accepted species".

"laevigata" (Jiabo, 1978) Lentin and Williams, 1981, p.106. *Jr hom.* of *F. laevigata* (Drugg, 1967) Stover and Evitt, 1978. This transfer was unnecessary since He Cheng-quan and Qian Ze-shu, 1979, p.179 transferred *Palaeostomocystis leavigatus* to *Bosea*. NOW *Bosedinia laevigata.* See also *Fromea psilata;* formerly *Palaeostomocystis*.

?madurensis Cookson and Eisenack, 1982, p.29, pl.1, fig.9. Senonian. Cookson and Eisenack, *op.cit.* questionably included this species in *Fromea*.

FROMEA (cont'd)

micrograrulosa Jain, 1977, p.176, pl.6, fig.74. Early Albian.

minor (Jiabo, 1978, p.127, pl.32, fig.14-21) Lentin and Williams, 1981, p.106. Early Tertiary; formerly *Palaeostomocystis.*

oblonga (Deflandre, 1945, card 852) Stover and Evitt, 1978, p.48. Late Cretaceous; formerly *Palaeostomocystis.*

"pachyderma" (Kar, 1979, p.35, pl.4, fig.75) Jain, 1980, p.142 has shown this form to be a pteridophytic spore.

pachytheca (Cookson and Eisenack, 1971) *comb. nov.*
1971 *Palaeostomocystis pachytheca* Cookson and Eisenack, p.222, pl.11, fig. 7-9. Middle Cretaceous.

"psilata" Lentin and Williams, 1981, p.106, *nom. subst. pro Fromea laevigata* (Jiabo, 1978 p.126-127, pl.32, fig.23) Lentin and Williams, 1981, p.106 *non F. laevigata* (Drugg, 1967, p.35, pl.6, fig.14-15) Stover and Evitt, 1978, p.48. NOW *Bosedinia laevigata;* formerly *Palaeostomocystis laevigatus.* The erection of this species by Lentin and Williams, 1981, p.106 was unnecessary, since He Cheng-quan and Qian Ze-shu, 1979, p.179 had previously transferred it to *Bosea* He Cheng-quan and Qian Ze-shu.

quadrugata Duxbury, 1980, p.134, pl.4, fig.12-15; text-fig.15. Barremian.

"reticulata" (Davey, 1969b) Stover and Evitt, 1978, p.48. NOW *Batiacasphaera;* formerly *Chytroeisphaeridia.*

scabrata (Jiabo, 1978, p.127, pl.32, fig.24-25; pl.46, fig.3a-b) Lentin and Williams, 1981, p.107. Early Tertiary; formerly *Palaeostomocystis.*

"senegalensis" Jain and Millepied, 1977, p.284. *Jr syn.* of *Fromea granulata* according to Lentin and Williams, 1981, p.106.

senilis (McIntyre and Brideaux, 1980, p.18, pl.5, fig.12; pl.6, fig.1) Lentin and Williams, 1981, p.107. Valanginian; formerly *Palaeostomocystis.*

simplex Yun, 1981, p.56-57, pl.13, fig.10,15. Early Santonian.

staveia Elsik, 1977, p.100, 102, pl.2, fig.12-14. Late Eocene.

tornatilis (Drugg, 1978, p.71-72, pl.7, fig.4-6) Lentin and Williams, 1981, p.107. Callovian-Oxfordian; formerly *Palaeostomocystis.*

triquetra (Brideaux, 1977, p.20-21, pl.8, fig.1-6) Yun, 1981, p.56. Barremian; formerly *Palaeostomocystis.*

FROMEA (cont'd)

"warlinghamensis" Gitmez and Sarjeant, 1972, p.188-189, pl.1, fig.6,8; pl.9, fig.5-6. Kimmeridgian. *Jr syn.* of *Fromea amphora* according to Riley, 1979, p.221.

FUSIFORMACYSTA Morgan, 1975, p.161.

**salasii* Morgan, 1975, p.161, pl.2, fig.4a-c,5a-b. Early Neocomian.

G

"GALEA" Maier, 1959, p.305. *Jr hom.* of *Galea,* Meuschen, 1787. The type of the genus, *Galea galea,* was transferred to *?Areoligera* by Davey *et al.*, 1969, p.15. Sarjeant, 1983 re-evaluated the holotypes of most of the species. The reassignment of the species originally included in *"Galea"* are listed below.

"densicomata" (Maier, 1959). NOW *?Impletosphaeridium.*

*"*galea"* Maier, 1959, p.306, pl.29, fig.4; text-fig.2. This name is a tautonym so must be rejected in accordance with I.C.B.N. Art. 23.4. Because the species was illegitimate when erected, the transfer and emendation of *"G. galea"* by Sarjeant, 1983, p.108-111 is also illegitimate. The name *"G." mespilana* (Maier, 1959, p.306-307, pl.29, fig.5-6) is chosen as the new name in accordance with Article 72.2.

"koryka" Maier, 1959, p.310-311, pl.30, fig.7-8. Middle Miocene. *Jr syn.* of *Spiniferites ramosus* according to Sarjeant, 1983, p.91-92. See also *"?Chiropteridium korykum."*

"levis" Maier, 1959, p.308, pl.30, fig.1-2. Sarjeant, 1983, p.108 considered the species to be a *jr syn.* of *Chiropteridium mespilanum* (Maier) Lentin and Williams. See also *Cleistosphaeridium.*

"lychnea" Maier, 1959, p.310, pl.30, fig.6. In his restudy of the holotype of this species, Sarjeant, 1983, p.100-101 concluded that *"G. lychnea"* is a *jr syn.* of *Achomosphaera alcicornu* (Eisenack) Davey and Williams. This species was transferred to the acritarch genus *Baltisphaeridium* by Downie and Sarjeant, 1965, p.92.

"mespilana" (Maier, 1959). NOW *Chiropteridium.*

"twistringiensis" Maier, 1959, p.308-309, pl.30, fig.3-4. Sarjeant, 1983, p.95-96 considered this species to be a *jr syn.* of *Spiniferites ramosus* subsp. *multibrevis,* now *Spiniferites multibrevis* (Davey and Williams) Below.

"xiphea" Maier, 1959, p.309, pl.30, fig.5. In his restudy of the holotype of this species, Sarjeant, 1983, p.104 concluded that *"G. xiphea"* is a *jr syn.* of *Hystrichokolpoma rigaudiae* Deflandre and Cookson.

"*GARDODINIUM*" Alberti, 1961, p.18. Davey, 1978, p.893 transferred the type of the genus *Gardodinium, G. trabeculosum,* to *Chlamydophorella,* thereby making *Gardodinium* a *jr syn.* of *Chlamydophorella.* The transfer of *G. trabeculosum* to *Chlamydophorella* was rejected by Lentin and Williams, 1981, p.108 who retained the generic circumscription of *Gardodinium* by Stover and Evitt, 1978, p.48. Duxbury, 1983, p.41 also stated that *Gardodinium* is a *jr syn.* of *Chlamydophorella.* Present generic assignments of the individual species are given below.

"*albertii*" (Neale and Sarjeant, 1962). NOW *Chlamydophorella.* The transfer of this species to *Chlamydophorella* by Davey, 1978, p.893 was rejected by Lentin and Williams, 1981, p.108. It is herein accepted following the reasoning of Duxbury, 1983, p.41-42.

"*deflandrei*" (Clarke and Verdier, 1967). NOW *Aldorfia.*

"*eisenackii*" Alberti, 1961, p.18, pl.3, fig.8-13. Hauterivian-Aptian. This species, the original type of the genus, was considered to be a *jr syn.* of *Gardodinium trabeculosum* (Gocht, 1959) Alberti, 1961, by Davey, 1974, p.51. *Gardodinium trabeculosum* therefore became the correct name for the nomenclatural type of the genus, prior to designation of *Gardodinium* as a *jr syn.* of the genus *Chlamydophorella* Cookson and Eisenack.

"*elongatum*" Ch. Singh, 1971, p.381-383, pl.68, fig.3-4. Brideaux and McIntyre, 1975, p.33 considered this species to be a *jr syn.* of "*Gardodinium eisenackii*" Alberti, which Davey, 1974, p.51 considered to be a *jr syn.* of *Gardodinium trabeculosum* (Gocht) Alberti. The transfer of "*Gardodinium elongatum*" to *Chlamydophorella* by Davey, 1978, p.893 was rejected by Lentin and Williams, 1981, p.108, since it represented a superfluous transfer.

"*ordinale*" (Davey, 1974). NOW *Chlamydophorella.* The transfer of this species to *Chlamydophorella* by Davey, 1978, p.893 was rejected by Lentin and Williams, 1981, p.108. It is herein accepted following the reasoning of Duxbury, 1983, p.41-42.

"*pyriforme*" (Vozzhennikova, 1967). NOW *Chlamydophorella.* The transfer of this species to *Chlamydophorella* by Davey, 1978, p.893 was rejected by Lentin and Williams, 1981, p.108. It is herein accepted following the reasoning of Duxbury, 1983, p.41-42.

"**trabeculosum*" (Gocht, 1959) Alberti, 1961, p.18. NOW *Chlamydophorella;* formerly *Scriniodinium.* The original type of the genus *Gardodinium, G. eisenackii,* was considered to be a *jr syn.* of *G. trabeculosum* by Davey, 1974, p.51; the latter therefore became the correct name for the nomenclatural type of the genus. The transfer of this species to *Chlamydophorella* by Davey, 1978, p.893 was rejected by Lentin and Williams, 1981, p.108. It is herein accepted following the reasoning of Duxbury, 1983, p.41-42.

GEISELODINIUM Krutzsch, 1962, p.42. See also *Cubiculosphaera* which is a *jr syn.* of this genus.

apicidentatum (Jiabo, 1978, p.81, pl.2, fig.11) Song Zhi-chen and He Cheng-quan, 1982, p.735. Early Tertiary; formerly *?Deflandrea.*

eocenicum Krutzsch, 1962, p.44, pl.11, fig.17-19; text-fig.1d. Middle Eocene.

**geiseltalense* Krutzsch, 1962, p.43, pl.11, fig.8-13; text-fig.1b. Middle Eocene.

hallense Krutzsch, 1962, p.44, pl.11, fig.14-16; text-fig.1c. Middle Eocene.

"*inaffectum*" (Drugg, 1978). NOW *?Subtilisphaera.*

maslinense (Harris, 1974, p.164, pl.2, fig.10) Stover and Evitt, 1978, p.231. Middle Eocene; formerly *Cubiculosphaera.*

?miocenicum Nagy, 1965, p.201, pl.1, fig.3; pl.2, fig.11. Middle Miocene. Stover and Evitt, 1978, p.231 considered this to be a "provisionally accepted species".

"*paeminosum*" (Drugg, 1978). NOW *?Subtilisphaera.*

psilatum Jain and Millepied, 1973, p.29-30, pl.2, fig.20-21. Campanian-Maastrichtian. Stover and Evitt, 1978, p.231 considered this to be a "problematical species".

tenerum (Krutzsch, 1962, p.44, pl.11, fig.20-22; text-fig.1e) Stover and Evitt, 1978, p.231. Middle Eocene. Originally *?Deflandrea;* subsequently *Vozzhennikovia.* See also *Dioxya.*

tyonekense Engelhardt, 1976, p.122, pl.1, fig.1-14. Miocene.

GELATIA Bujak, 1984, p.185.

**inflata* Bujak, 1984, p.185-186, pl.1, fig.13-20; text-fig.2. Late Eocene-Late Oligocene.

GERDIOCYSTA Liengjarern *et al.*, 1980, p.482.

aciculata Châteauneuf, 1980, p.139, pl.24, fig.2,5. Late Eocene-Oligocene (Lutetian-Stampian).

cassiculus (Drugg, 1970b, p.811, fig.2B,3A-B) Liengjarern *et al.*, 1980, p.483. Early Eocene; formerly *Areoligera.* N.I.A.

**conopium* Liengjarern *et al.*, 1980, p.483, pl.53, fig.1-2. Early Oligocene.

GERLACHIDIUM Benedek and Sarjeant, 1981, p.338,340.

**aechmophorum* (Benedek, 1972, p.41, pl.5, fig.7,11; text-fig.17) Benedek and Sarjeant, 1981, p.340. Middle-Late Oligocene. At the time of the transfer, Benedek and Sarjeant, 1981, p.340-342 emended the diagnosis. Originally *Lejeunia;* subsequently *?Wilsonidium,* then *Lejeunecysta.* The transfer of this species to *Lejeunecysta* by Wilson and Clowes, 1980, p.63 and Bujak and Davies, 1983, p.162 is herein rejected.

GILLINIA Cookson and Eisenack, 1960a, p.11-12.

**hymenophora* Cookson and Eisenack, 1960a, p.12, pl.3, fig.4-6; text-fig.5. ?Turonian-Maastrichtian.

GINGINODINIUM Cookson and Eisenack, 1960a, p.7; emend. Lentin and Williams, 1976, p.95-96.

?claustrum Islam, 1983b, p.339, pl.2, fig.12-14; text-fig.6. Early Eocene. Islam, *op.cit.* questionably included this species in *Ginginodinium.*

evittii Ch. Singh, 1983, p.135-136, pl.46, fig.7-10. Early Cretaceous-Early Cenomanian.

ornatum (Felix and Burbridge, 1973, p.23-24, pl.4, fig.12) Lentin and Williams, 1976, p.97. Maastrichtian; formerly *Trithyrodinium.*

paleocenicum (Cookson and Eisenack, 1965c, p.142-143, pl.19, fig.1-4) Stover and Evitt, 1978, p.106. Middle Paleocene. Originally *Peridinium;* subsequently *?Cooksoniella,* then *Palaeoperidinium.*

**spinulosum* Cookson and Eisenack, 1960a, p.7, pl.2, fig.9. Late Albian-Cenomanian.

tabulatum Cookson and Eisenack, 1965c, p.143-144, pl.19, fig.5-8; text-fig.3. Middle Paleocene. See also *Palaeoperidinium.*

"GLABRIDINIUM" Brideaux, 1977, p.35. Sarjeant, 1982, p.41 considered this genus to be a *jr syn.* of *Tubotuberella* Vozzhennikova; emend. Sarjeant, 1982. The type and single species of the genus, *"Glabridinium apatelum",* is accordingly included in *Tubotuberella.*

*"*apatelum"* (Cookson and Eisenack, 1960b) Brideaux, 1977, p.35. NOW and formerly *Tubotuberella.* Originally *Scriniodinium;* subsequently *Psaligonyaulax.*

GLAPHYROCYSTA Stover and Evitt, 1978, p.49-50.

assamica (Jain *et al.,* 1975, p.11, pl.5, fig.61-62; pl.6, fig.73) Jain, 1982, p.52. Danian; formerly *?Cyclonephelium.*

GLAPHYROCYSTA (cont'd)

circularis Matsuoka, 1984a, p.378, pl.71, fig.2-5. Middle Eocene.

combinata (Jiabo, 1978, p.78, pl.27, fig.3) Lentin and Williams, 1981, p.110. Early Tertiary; formerly *Cyclonephelium*.

"*combinata*" (He Cheng-quan and Li Peng, 1981, p.63, pl.33, fig.5-6). *Jr hom.* of *Glaphyrocysta combinata* (Jiabo, 1978) Lentin and Williams, 1981. NOW *Glaphyrocysta heliensis*.

dentata Matsuoka, 1984a, p.378-379, pl.71, fig.1. Middle Eocene.

divaricata (Williams and Downie, 1966c, p.223-224, pl.25, fig.1; text-fig.60) Stover and Evitt, 1978, p.50. Early Eocene; formerly *Cyclonephelium*.

exuberans (Deflandre and Cookson, 1955, p.285) Stover and Evitt, 1978, p.50. Early Eocene. Originally *Membranilarnax pterospermoides* O. Wetzel *sensu* Pastiels, 1948, p.46, pl.5, fig.11,13-14; subsequently *Cyclonephelium*.

heliensis nom. nov., nom. subst. pro Glaphyrocysta combinata (He Cheng-quan and Li Peng, 1981, p.63, pl.33, fig.5-6) *non Glaphyrocysta combinata* (Jiabo, 1978, p.78, pl.27, fig.3) Lentin and Williams, 1981, p.110. Late Oligocene.

inculta (Morgenroth, 1966b, p.9, pl.2, fig.5) Stover and Evitt, 1978, p.50. Early Oligocene; formerly *Cyclonephelium*.

intricata (Eaton, 1971, p.365, pl.4, fig.8-10) Stover and Evitt, 1978, p.50. Middle Eocene; formerly *Cyclonephelium*.

kachchhensis Jain and Tandon, 1981, p.9, pl.1, fig.17-19. Middle Eocene.

laciniiformis (Gerlach, 1961, p.206, pl.29, fig.4) Stover and Evitt, 1978, p.50. Middle-Late Oligocene; formerly *Cyclonephelium*.

microfenestrata (Bujak, 1976, p.112, pl.3, fig.12; pl.4, fig.1-7; text-fig.3I) Stover and Evitt, 1978, p.50. Late Eocene; formerly *Cyclonephelium*.

multiperforata He Cheng-quan and Li Peng, 1981, p.63-64, pl.33, fig.7-9. Late Oligocene.

ordinata (Williams and Downie, 1966c, p.225-227, pl.25, fig.3; text-fig.62) Stover and Evitt, 1978, p.50. Early Eocene; formerly *Cyclonephelium*.

paradoxa He Cheng-quan and Li Peng, 1981, p.64, pl.33, fig.1-2. Late Oligocene.

GLAPHYROCYSTA (cont'd)

pastielsii (Deflandre and Cookson, 1955, p.285) Stover and Evitt, 1978, p.50. Early Eocene. Originally *Membranilarnax* cf. *liradiscoides* O. Wetzel *sensu* Pastiels, 1948, p.47, pl.5, fig.15. The references to Pastiels, 1948 in Downie and Sarjeant, 1965, (as pl.5, fig.5) and in Harker and Sarjeant, 1975, p.226 (as p.47, pl.15, fig.5) are incorrect. The correct citation is Pastiels, 1948, p.47, pl.5, fig.15. Also formerly *Cyclonephelium*.

paupercula Liengjarern *et al.*, 1980, p.483-484,486, pl.53, fig.3,5. Early Oligocene.

?reticulosa (Gerlach, 1961, p.204, pl.29, fig.2) Stover and Evitt, 1978, p.50. Middle-Late Oligocene; formerly *Cyclonephelium*. Stover and Evitt, *op.cit.* considered this to be a "provisionally accepted species".

**retiintexta* (Cookson, 1965a, p.88, pl.11, fig.4) Stover and Evitt, 1978, p.50. ?Senonian; formerly *Cyclonephelium*.

semitecta (Bujak *in* Bujak *et al.*, 1980, p.46,48,50, pl.14, fig.2-9; text-fig.13) Lentin and Williams, 1981, p.111. Late Eocene; formerly *Cyclonephelium*.

?spineta (Eaton, 1976, p.259-260, pl.8, fig.3; text-fig.12) Stover and Evitt, 1978, p.50. Early-Middle Eocene; formerly *Cyclonephelium*. Stover and Evitt, *op.cit.* considered this to be a "provisionally accepted species".

texta (Bujak, 1976, p.110, pl.3, fig.6-11; text-fig.3G-H) Stover and Evitt, 1978, p.50. Late Eocene; formerly *Cyclonephelium*.

?undulata (Eaton, 1976, p.248, pl.4, fig.4,6; pl.5, fig.2,4; text-fig.8c,9) Stover and Evitt, 1978, p.50. Middle-Late Eocene; formerly *Areoligera*. Stover and Evitt, *op.cit.* considered this to be a "provisionally accepted species".

?vicina (Eaton, 1976, p.260-261, pl.8, fig.4-5; text-fig.13) Stover and Evitt, 1978, p.50. Early-Late Eocene; formerly *Cyclonephelium*. Stover and Evitt, *op.cit.* considered this to be a "provisionally accepted species".

yinggehaica He Cheng-quan and Li Peng, 1981, p.64, pl.32, fig.1-6; text-fig.5. Late Oligocene.

GLENODINIUM Ehrenberg, 1837, p.174. Modern genus defined from the motile stage.

emrecyniense Woloszynska, 1928. Modern species recorded by Macko, 1957, p.117, pl.A, fig.1; pl.73, fig.15-16. Miocene. Since the detailed morphology of Macko's specimens is unknown, they are retained in *Glenodinium* pending further examination.

GLOMODINIUM Dodekova, 1975, p.26. This genus was considered by Stover and Evitt, 1978, p.116-117 to be a *jr syn.* of *Pareodinia.* Dörhöfer and Davies, 1980, p.12 and Davies, 1983, p.17 argued that the genus should be maintained for species with a 3I archeopyle.

evittii (Pocock, 1972, p.94-95, pl.24, fig.6,8; text-fig.11) Davies, 1983, p.17. Late Bajocian-Callovian. Originally *Tenua;* subsequently *Pareodinia.* This species was invalidly transferred to *Glomodinium* by Dodekova, 1975, p.27. See also *Pareodinia tripartita* which is a *jr syn.* of this species.

opeasatos Davies, 1983, p.17, pl.3, fig.13-16; text-fig.10. Late Bathonian to Oxfordian. N.I.A.

**reticulopilosum* Dodekova, 1975, p.26-27, pl.5, fig.1-6. Late Bathonian. The transfer of this species to *Pareodinia* was rejected by Dörhöfer and Davies, 1980, p.12 and Davies, 1983, p.17.

"*tripartitum*" (Johnson and Hills, 1973) Davies, 1983, p.17. The transfer of this species to *Glomodinium* by Davies, *op.cit.* is herein rejected. See *Pareodinia "tripartita"*.

zabrus Davies, 1983, p.18, pl.3, fig.2-12; text-fig.11. Bathonian-Oxfordian.

GLOSSODINIUM Ioannides *et al.*, 1977, p.452-453; emend. Courtinat *in* Courtinat and Gaillard, 1980, p.30. Drugg, 1978, p.67 considered this genus to be a *jr syn.* of *Dinopterygium* and transferred the type of the genus, *Glossodinium dimorphum,* to *Dinopterygium*. Courtinat *in* Courtinat and Gaillard, *op.cit.* emphasized the distinctive nature of the archeopyle in *G. dimorphum* and retained that species in *Glossodinium.* The remaining species, *"Glossodinium bicuneatum"* (Deflandre, 1938b) Ioannides *et al.*, 1977, was herein transferred to *Dinopterygium* by Lentin and Williams, 1981, p.112.

**dimorphum* Ioannides *et al.*, 1977, p.453, pl.2, fig.13-14; text-fig.8. Kimmeridgian; see also *Dinopterygium.*

shihebeiense Yu Jingxian, 1982, p.246, pl.3, fig.1,5-7. Late Jurassic-Early Cretaceous.

GLYPHANODINIUM Drugg, 1964, p.237-238.

**facetum* Drugg, 1964, p.238-239, fig.1-6. Danian.

GOCHTEODINIA Norris, 1978, p.7.

judilentiniae McIntyre and Brideaux, 1980, p.23-24, pl.11, fig.4-9. Valanginian.

mutabilis (Riley *in* Fisher and Riley, 1980, p.324-325, pl.3, fig.1-3) Davey, 1982b, p.24. Volgian; formerly *Pareodinia.*

GOCHTEODINIA (cont'd)

verrucosa (Vozzhennikova, 1967, p.56, pl.12, fig.6) Dörhöfer and Davies, 1980, p.30. Late Jurassic. Originally *Imbatodinium;* subsequently Pareodinia.

**villosa* (Vozzhennikova, 1967, p.56, pl.12, fig.1-3; pl.13, fig.1-3; pl.14, fig. 1-2; pl.15, fig.1-2) Norris, 1978, p.7. Late Jurassic. Originally *Imbatodinium villosum;* subsequently *Pareodinia dasyforma.*

subsp. *multifurcata* Davey, 1982b, p.23, pl.6, fig.13. Late Ryazanian-Valanginian.

virgula Davey, 1982b, p.23-24, pl.6, fig.2-3,7-8,10-11. Portlandian.

GOCHTODINIUM Bujak, 1979, p.310-312.

**simplex* Bujak, 1979, p.312-313, pl.2, fig.10; pl.3, fig.1-12; text- fig.4B,8F. Late Eocene.

spinula Bujak, 1979, p.313, pl.2, fig.3-9; text-fig.8E. Late Eocene.

GONGYLODINIUM Fenton *et al.*, 1980, p.158.

**erymnoteichos* Fenton *et al.*, 1980, p.158-159, pl.14, fig.6-9. Late Bajocian-Early Bathonian.

hocneratum Fenton *et al.*, 1980, p.159-160, pl.16, fig.2. Late Bajocian.

GONIODOMA Stein, 1883, p.9,13,16,19,21. Modern genus defined from the motile stage. Fossil cysts formerly included within this genus have been transferred to *Dinopterygium.*

GONYAULACYSTA Deflandre, 1964, p.5030; emend. Sarjeant, 1969, p.7-8; emend. Stover and Evitt, 1978, p.157-158; emend. Sarjeant, 1982, p.27-28. See also *Nelchinopsis* which is a *jr syn.* of this genus.

"aculeata" (Klement, 1960) Sarjeant, 1969, p.8. NOW *Acanthaulax;* formerly *Gonyaulax.*

"aichmetes" (Sarjeant, 1966b). NOW *Cribroperidinium.*

"aldorfensis" (Gocht, 1970b). NOW *Aldorfia.*

"amabilis" (Deflandre, 1939) Dodekova, 1971, p.7. NOW *?Leptodinium;* formerly *Gonyaulax.*

"ambigua" (Deflandre, 1939) Sarjeant, 1969, p.8. NOW *Leptodinium;* formerly *Gonyaulax.* See also *Millioudodinium.*

GONYAULACYSTA (cont'd)

"angulosa" (Gitmez, 1970). NOW *Meristaulax. Jr syn.* of *Cribroperidinium granulatum* (Klement) Stover and Evitt according to Fisher and Riley, 1980, p.321. This view is refuted by Sarjeant, 1984a, p.160.

"apionis" (Cookson and Eisenack, 1958) Sarjeant, 1969, p.8. NOW *Cribroperidinium;* formerly *Gonyaulax.* See also *Millioudodinium.*

"aptiana" (Deflandre, 1935) Millioud, 1969, p.428. NOW and formerly *Rhynchodiniopsis.* This transfer has not found acceptance.

"areolata" Sarjeant, 1961a, p.95. Erected as *Gonyaulax areolata,* which was a *jr hom.;* it was subsequently given the name *Gonyaulacysta scarburghensis* by Sarjeant, 1964c, p.472-473. A *jr hom.* can be validly published, but is illegitimate (I.C.B.N. Art. 6.4; Art. 64.1). Therefore, a *nom. nov.* must replace it, in this case *Gonyaulacysta scarburghensis.* This *nom. nov.* is the oldest legitimate name (Art. 6.3). According to Art. 55, when a species is transferred, the legitimate epithet is transferred to the new generic name. NOW *Acanthaulax scarburghensis.*

"auctifica" (Brideaux, 1971). NOW *Cribroperidinium.*

axicerastes Sarjeant, 1966b, p.114-116, pl.13, fig.11-12; text-fig.25. Middle Barremian.

"birkelundii" (Fensome, 1979). NOW *?Cribroperidinium.*

"boreas" (Davey, 1974). NOW *Cribroperidinium.*

"canadensis" Pocock, 1972, p.89, pl.24, fig.1-2; text-fig.4. Oxfordian-Kimmeridgian. *Jr syn.* of *Hystrichogonyaulax cladophora* (Deflandre) Stover and Evitt according to Fisher and Riley, 1980, p.320. The transfer of *"G. canadensis"* to *Hystrichogonyaulax* by Stover and Evitt, 1978, p.162 was therefore unnecessary.

cassidata (Eisenack and Cookson, 1960, p.3, pl.1, fig.5-6) Sarjeant, 1966b, p.125-126. Aptian-Cenomanian; formerly *Gonyaulax helicoidea* subsp. *cassidata.*

"cauda" (Gitmez and Sarjeant, 1972). NOW *Cribroperidinium;* formerly *Millioudodinium.* See also *Rhynchodiniopsis.*

centriconnata Riding, 1983, p.197-200,202; text-fig.2-3; pl.1, pl.2, fig.1-8. Middle Callovian-Early Oxfordian.

"cladophora" (Deflandre, 1938b) Dodekova, 1967, p.17-18. NOW *Hystrichogonyaulax;* formerly *Gonyaulax.*

GONYAULACYSTA "cladophora" (cont'd)

subsp. *"cladophora"* (Deflandre, 1938b) Lentin and Williams, 1973, p.59. NOW *Hystrichogonyaulax cladophora* subsp. *cladophora;* formerly *Gonyaulax cladophora* subsp. *cladophora.*

subsp. *"extensa"* (Klement, 1960) Lentin and Williams, 1973, p.60. NOW *Hystrichogonyaulax cladophora* subsp. *extensa;* formerly *Gonyaulax cladophora* subsp. *extensa.*

subsp. *"hemipolyedrica"* (Klement, 1960) Lentin and Williams, 1973, p.60. NOW *Hystrichogonyaulax cladophora* subsp. *hemipolyedrica;* formerly *Gonyaulax cladophora* subsp. *hemipolyedrica.*

subsp. *"isovalvata"* (Klement, 1960) Lentin and Williams, 1973, p.60. NOW *Hystrichogonyaulax cladophora* subsp. *isovalvata;* formerly *Gonyaulax cladophora* subsp. *isovalvata.*

"clathrata" (Cookson and Eisenack, 1960b) Dodekova, 1971, p.10. NOW *Leptodinium.*

"compta" (Duxbury, 1980). NOW *Apteodinium.*

"confossa" (Duxbury, 1977). NOW *?Cribroperidinium.*

"confusa" (Vozzhennikova, 1967) Sarjeant, 1969, p.9. NOW *?Rhynchodiniopsis;* formerly *Gonyaulax.* See also *?Millioudodinium.*

cornuta (Cookson and Eisenack, 1962b, p.490, pl.3, fig.1-6) Yun, 1981, p.10. Aptian-?Albian; formerly *?Pterodinium.*

"?crassicornuta" (Klement, 1960) Sarjeant, 1969, p.9. NOW *Rhynchodiniopsis;* formerly *Gonyaulax.* Stover and Evitt, 1978, p.158 considered this to be a "provisionally accepted species" of *Gonyaulacysta.*

cretacea (Neale and Sarjeant, 1962, p.441, pl.19, fig.1-2; text-fig.2) Sarjeant, 1969, p.9. Hauterivian; formerly *Gonyaulax.*

"crispa" (W. Wetzel, 1967) Sarjeant, 1969, p.9. NOW *Acanthaulax;* formerly *Gonyaulax.* See also *Cribroperidinium* and *Hystrichogonyaulax.*

"cristata" (Riley *in* Fisher and Riley, 1980). NOW *Cribroperidinium.*

?cypraea (Ioannides *et al.*, 1977, p.460, pl.4, fig.5-8; text-fig.12) Sarjeant, 1982, p.28. Kimmeridgian; formerly *?Psaligonyaulax.* Sarjeant, *op.cit.* considered this to be a "provisionally accepted species".

GONYAULACYSTA (cont'd)

"dangeardii" (Sarjeant, 1968). NOW *Tubotuberella.* Lentin and Williams, 1981, p.114 did not accept the transfer of this species to *Tubotuberella* by Stover and Evitt, 1978, p.197, preferring to retain it in *Dimidiadinium.* In view of the emendation of Sarjeant, 1982, p.42-43, however, the transfer proposed by Stover and Evitt, 1978, p.197 is herein accepted.

"deflandrei" (Sarjeant, 1966b) Below, 1981a, p.53. The transfer of this species to *Gonyaulacysta* by Below, *op.cit.* was rejected by Lentin and Williams, 1981, p.115, who retained the species in *Psaligonyaulax.* As *Gonyaulacysta deflandrei* it would be a *jr homonym.*

"deflandrei" (Riley *in* Fisher and Riley, 1980). NOW *Cribroperidinium.*

"delicata" (Davey, 1969a). NOW *?Leptodinium.*

diamanta (Churchill and Sarjeant, 1963, p.34-36, pl.1, fig.19; text-fig.3) Lentin and Williams, 1976, p.76. Holocene. Originally *Peridinium;* subsequently *?Phthanoperidinium.*

"diaphanis" (Cookson and Eisenack, 1958) Sarjeant, 1969, p.9. NOW *Cribroperidinium;* formerly *Gonyaulax.*

"dictyophora" (Deflandre, 1938b) Sarjeant, 1967b, p.249. NOW *Aldorfia;* formerly *Palaeoperidinium.*

diutina Duxbury, 1977, p.34-35, pl.1, fig.3-4; text-fig.9. Berriasian-Hauterivian. See also *?Millioudodinium.*

"downiei" Pocock, 1972, p.87, pl.22, fig.1-2; text-fig.2. Oxfordian-Kimmeridgian. Fisher and Riley, 1980, p.320 considered this species to be a *jr syn.* of *Hystrichogonyaulax cladophora* (Deflandre) Stover and Evitt. The contention of Fisher and Riley, *op.cit.* was accepted by Lentin and Williams, 1981, p.115 but was rejected on a later page, p.150, of the same paper. This inconsistency is removed in the present index. Acceptance of the views of Fisher and Riley, 1980, negates the transfer of this species to *?Rhynchodiniopsis* by Sarjeant, 1982, p.36. See also *Hystrichosphaeropsis downiei.*

"dualis" (Brideaux and Fisher, 1976, p.18-20, pl.1, fig.4-6,8-12; pl.2, fig.1-2) Stover and Evitt, 1978, p.158. Late Oxfordian-Late Kimmeridgian; formerly *Psaligonyaulax.* Sarjeant, 1982, p.29 considered this species to be a *jr syn.* of *Gonyaulacysta jurassica.*

"edwardsii" (Cookson and Eisenack, 1958) Clarke and Verdier, 1967, p.31. NOW *Cribroperidinium;* formerly *Gonyaulax.*

"ehrenbergii" (Gitmez, 1970). NOW *Cribroperidinium.*

***GONYAULACYSTA* (cont'd)**

eisenackii (Deflandre, 1938b, p.171, pl.6, fig.7-10; text-fig.3-4) Dodekova, 1967, p.18; emend. Sarjeant, 1982, p.32-33. Oxfordian; formerly *Gonyaylax*. See also *Endoscrinium* and *Tubotuberella*. Sarjeant, 1982, p.32 considered the subspecies *Gonyaulacysta eisenackii* subsp. *oligodentata* to be synonymous with *Gonyaulacysta eisenackii* subsp. *eisenackii*.

subsp. *"oligodentata"* (Cookson and Eisenack, 1958) Sarjeant, 1972, p.17. This transfer was rejected by Lentin and Williams, 1977b, p.65 and the subspecies retained in *Tubotuberella eisenackii*. See also *Endoscrinium eisenackii* subsp. *oligodentatum*.

elamii Horowitz, 1975, p.25-26, pl.1, fig.9. Late Triassic. Stover and Evitt, 1978, p.158 considered this to be a "problematical species".

"episoma" (Sarjeant, 1966b). NOW *Leptodinium*. See also *Millioudodinium* and *Rhynchodiniopsis*.

"evittii" (Dodekova, 1969). NOW *Occisucysta*.

"exilicristata" (Davey, 1969a). NOW *Cribroperidinium*.

exsanguia Duxbury, 1977, p.35-36, pl.1, fig.6-7; text-fig.10. Hauterivian-Barremian. See also *Millioudodinium*.

"extensa" Clarke and Verdier, 1967, p.30, pl.4, fig.7-9; text-fig.11. *Jr syn.* of *Psaligonyaulax deflandrei* Sarjeant, 1966b according to Clarke *et al.*, 1968, p.181.

"fallax" (Morgenroth, 1968). NOW *Apteodinium*.

?fastigiata Duxbury, 1977, p.36-37, pl.1, fig.8-9,12; text-fig.11. Hauterivian-Barremian. Sarjeant, 1982, p.28 considered this to be a "provisionally accepted species".

"fetchamensis" (Sarjeant, 1966b). NOW *Cribroberidinium*. See also *Millioudodinium*.

"filapicata" (Gocht, 1970b). NOW *Diacanthum*.

"fimbriata" (Duxbury, 1980). NOW *Rhynchodiniopsis*.

"forulata" (Yu Jingxian, 1982). NOW *?Cribroperidinium*.

"fragosa" Brideaux, 1971, p.83, pl.23, fig.42; pl.24, fig.44-45; text-fig.8c-d. Harker and Sarjeant, 1975, p.224 and Brideaux and McIntyre, 1975, p.33 considered this species to be a *jr syn.* of *Endoscrinium campanulum* (Gocht) Vozzhennikova.

giga Horowitz, 1970, p.178, pl.4, fig.20. Late Jurassic-Early Cretaceous. Stover and Evitt, 1978, p.158 considered this to be a "problematical species".

"gigas" (Raynaud, 1978). NOW *?Cribroperidinium.*

"giuseppei" (Morgenroth, 1966a) Sarjeant, 1969, p.9. NOW *Cribroperidinium;* formerly *Gonyaulax.* See also *?Millioudodinium.*

subsp. *"major"* (Morgenroth, 1966a) Lentin and Williams, 1973, p.61. See *Cribroperidinium giuseppei;* formerly *Gonyaulax giuseppei subsp. major.* See also *?Millioudodinium giuseppei* subsp. *major.*

"globata" (Gitmez and Sarjeant, 1972). NOW *Cribroperidinium.* See also *Millioudodinium* and *Rhynchodiniopsis.*

"globosa" (Brideaux, 1971). NOW *?Cribroperidinium.*

"gongylos" (Sarjeant, 1966b). NOW *Rhynchodiniopsis.* See also *?Leptodinium.*

"gottisii" (Dupin, 1968). NOW *Apteodinium.*

"granulata" (Klement, 1960) Sarjeant, 1969, p.9. NOW *Meristaulax;* formerly *Gonyaulax.* See also *Cribroperidinium* and *Rhynchodiniopsis.*

"granuligera" (Klement, 1960) Sarjeant, 1969, p.10. NOW *Cribroperidinium;* formerly *Gonyaulax.* If this species is a *jr syn.* of *Meristaulax granulata* (Klement) Sarjeant - as believed by Fisher and Riley, 1980, p.321 - its transfer to *Cribroperidinium* by Stover and Evitt, 1978, p.150 and to *Rhynchodiniopsis* by Sarjeant, 1982, p.35 was unnecessary. However, Sarjeant, 1984a, p.156-158 has demonstrated that *Cribroperidinium granuligerum* is a distinct and separate species. Accordingly, we herein retain it in *Cribroperidinium.*

"hadra" (Sarjeant, 1966b). NOW *?Leptodinium.* See also *Millioudodinium* and *Rhynchodiniopsis.*

helicoidea (Eisenack and Cookson, 1960, p.2, pl.1, fig.4,9) Sarjeant, 1966b, p.116-117. Neocomian-Aptian; formerly *Gonyaulax.*

subsp. *tuberculata* (Vozzhennikova, 1967, p.83, pl.41, fig.3a-b) Lentin and Williams, 1973, p.62. Tithonian; formerly *Gonyaulax helicoidea* var. *tuberculata.* The variety was correctly transferred to *Gonyaulacysta* by Dodekova, 1971, p.10.

"hyaloderma" (Deflandre, 1939) Sarjeant, 1967b, p.252. NOW *?Rhynchodiniopsis;* formerly *Palaeoperidinium.* Stover and Evitt, 1978, p.158 considered this to be a "problematical species".

GONYAULACYSTA **(cont'd)**

"hyalodermopsis" (Cookson and Eisenack, 1958) Sarjeant, 1969, p.10. NOW *Rhynchodiniopsis;* formerly *Gonyaulax.* See also *?Leptodinium.*

"incomposita" (Drugg, 1970b). NOW *Corrudinium.*

"indicosa" Brideaux, 1971, p.83, *nom. subst. pro Palaeoperidinium granulatum* Ch. Singh, 1964, p.135, pl.18, fig.2-3. NOW *?Apteodinium.* Middle-Late Albian.

"irmoechinata" (Heisecke, 1970) Lentin and Williams, 1976, p.41. NOW *?Spinidinium;* formerly *Deflandrea.*

"italica" (Corradini, 1973). NOW *Hystrichogonyaulax.* See also *?Millioudodinium.*

**jurassica* (Deflandre, 1938b, p.168, pl.6, fig.2-5; text-fig.1-2) Norris and Sarjeant, 1965, p.65; emend. Sarjeant, 1982, p.28-30. Oxfordian; formerly *Gonyaulax.* See also *Gonyaulacysta dualis* which is a *jr syn.* of this species.

subsp. *adecta* Sarjeant, 1982, p.30-31, pl.1-3; pl.4, fig.1-4,9; pl.6, fig.4-5,9. Callovian.

var. *longicornis* (Deflandre, 1938b, p.171, pl.6, fig.6) Sarjeant, 1982, p.31. Oxfordian. Originally *Gonyaulax jurassica* var. *longicornis; subsequently Gonyaulacysta jurassica* var. *longicornis,* then *Gonyaulacysta jurassica* subsp. *longicornis.*

subsp. *"brevis"* (Johnson and Hills, 1973, p.206, pl.1, fig.11,14) Lentin and Williams, 1975, p.2151. ?Late Callovian-Early Oxfordian; formerly *Gonyaulacysta jurassica* var. *brevis.* Sarjeant, 1982, p.31 considered this taxon to be a *jr syn.* of *Gonyaulacysta jurassica* subsp. *adecta* var. *longicornis.*

subsp. *jurassica* (Deflandre, 1938b, p.168, pl.6, fig.2-5; text-fig.1-2) Norris and Sarjeant, 1965, p.65; emend. Sarjeant, 1982, p.30. Oxfordian.

var. *longicornuta* Sarjeant, 1982, p.31-32, pl.5, fig.5-6. Early-Middle Kimmeridgian.

subsp. *"longicornis"* (Deflandre, 1938b) Lentin and Williams, 1973, p.62. NOW *Gonyaulacysta jurassica* subsp. *adecta* var. *longicornis.* Originally *Gonyaulax jurassica* var. *longicornis;* subsequently *Gonyaulacysta jurassica* var. *longicornis,* then *Gonyaulacysta jurassica* subsp. *longicornis.* The subspecies was transferred as a variety to the genus *Gonyaulacysta* by Gitmez, 1970, p.260. The retention of this taxon as a variety by Fensome, 1979, p.38 was rejected by Lentin and Williams, 1981, p.117.

***GONYAULACYSTA* (cont'd)**

?kleithria Duxbury, 1983, p.47-48, pl.5, fig.1-2; text-fig.22. Early Aptian. Duxbury, *op.cit.* questionably included this species in *Gonyaulacysta*.

kostromiensis (Vozzhennikova, 1967, p.85, pl.26, fig.1-6; pl.27, fig.1-2) Sarjeant, 1969, p.10. Valanginian; formerly *Gonyaulax*. The transfer of this species to *Nelchinopsis* by Wiggins, 1972, p.301-302 was rejected by Duxbury, 1977, p.37.

kunzeviensis (Vozzhennikova, 1967, p.87, pl.27, fig.6; pl.30, fig.2; pl.33, fig.6) Davies, 1983, p.18. Valanginian; formerly *Gonyaulacysta perforans* var. *kunzeviensis*.

"*lagenoides* Olaru, 1978, p.80, pl.14, fig.7. Middle Oligocene.

"*?longicornis*" (Downie, 1957) Sarjeant, 1969, p.10. NOW *?Cribroperidinium;* formerly *Gonyaulax*. See also *Millioudodinium*. Stover and Evitt, 1978, p.158 considered this to be a "provisionally accepted species" of *Gonyaulacysta*.

"*magnoserrata*" (Cookson and Eisenack, 1962b) Yun, 1981, p.10. The transfer of this species to *Gonyaulacysta* by Yun, *op.cit.* is herein rejected and the species is retained in *?Spiniferites*.

"*?mamillifera*" (Deflandre, 1939) Sarjeant, 1969, p.10. NOW *Leptodinium;* formerly *Gonyaulax*. See also *?Millioudodinium* and *?Rhynchodiniopsis*. At the time of the transfer, Sarjeant, *op.cit.* questionably included this species in *Gonyaulacysta*.

"*?mecsekensis*" (Nagy, 1969) Lentin and Williams, 1976, p.110. NOW *Apteodinium;* formerly *Palaeoperidinium*. See also *?Millioudodinium*. O.C. At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Gonyaulacysta*.

?membranea Yu Jingxian, 1982, p.241, pl.3, fig.9,11. Late Jurassic-Early Cretaceous. Pending re-examination of the holotype, we herein regard this taxon as a provisionally accepted species of *?Gonyaulacysta*.

microceras (Eisenack, 1958, p.391, pl.21, fig.13) Clarke and Verdier, 1967, p.31. Late Aptian; formerly *Gonyaulax*.

"*mirabilis*" (Klement, 1960) Dodekova, 1967, p.19. NOW and formerly *Leptodinium*.

"*monacantha*" (Deflandre, 1935) Lentin and Williams, 1976, p.110. NOW *Apteodinium;* formerly *Palaeoperidinium*. See also *Millioudodinium*. Sarjeant, 1967b, p.252 recommended transfer of this species to *Gonyaulacysta*.

"*mosaica*" (Downie, 1957). NOW *?Leptodinium*.

GONYAULACYSTA (cont'd)

"muderongensis" (Cookson and Eisenack, 1958) Sarjeant, 1966b, p.131. NOW *Cribroperidinium.*

"nannotrix" (Deflandre, 1939) Sarjeant, 1969, p.10. NOW *?Rhynchodiniopsis;* formerly *Gonyaulax.* Stover and Evitt, 1978, p.159 considered this to be a "problematical species".

"nuciformis" (Deflandre, 1938b) Sarjeant, 1968, p.227. NOW *Apteodinium;* Originally *Palaeoperidinium;* subsequently *Gonyaulax.*

"?nuda" (Nagy, 1969) Lentin and Williams, 1976, p.110. NOW *?Tectatodinium.* See discussion under *"Palaeoperidinium pannonium".* At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Gonyaulacysta.*

"obesa" (Brideaux, 1971). NOW *?Cribroperidinium.* See also *Millioudodinium* and *Rhynchodiniopsis.*

?obscura (Lejeune-Carpentier, 1946, p.B191, fig.3-5) Sarjeant, 1969, p.10; emend. Lejeune-Carpentier and Sarjeant, 1981, p.4. Senonian; formerly *Gonyaulax;* see also *Millioudodinium.* Stover and Evitt, 1978, p.158 considered this to be a "provisionally accepted species" of *Gonyaulacysta.*

ordocava Duxbury, 1977, p.37-38, pl.1, fig.10-11; text-fig.12. Hauterivian. See also *Millioudodinium.*

"ornata" (Eisenack, 1935) Pocock, 1972, p.87-88. NOW *Ctenidodinium.*

"orthoceras" (Eisenack, 1958) Sarjeant, 1966b, p.121. NOW *Cribroperidinium;* formerly *Gonyaulax.*

"pachyderma" (Deflandre, 1938b) Sarjeant, 1969, p.10. NOW *Korystocysta.*

"palla" (Sarjeant, 1966b). NOW *Cribroperidinium.* See also *Millioudodinium* and *Rhynchodiniopsis.*

"pannonica" (Nagy, 1965) Lentin and Williams, 1973, p.63. NOW *?Cribroperidinium;* formerly *Gonyaulax.* See also *Millioudodinium.*

"parorthoceras" (Davey, 1968). NOW *?Cribroperidinium.*

"pectinigera" (Gocht, 1970) Fensome, 1979, p.43. Fensome's emendation of this species was accepted by Lentin and Williams, 1981, p.119, but not his transfer to *Gonyaulacysta.* See *Hystrichogonyaulax pectinigera.*

"pennata" (Riley *in* Fisher and Riley, 1980). NOW *Hystrichogonyaulax.*

GONYAULACYSTA (cont'd)

"perforans" (Cookson and Eisenack, 1958) Sarjeant, 1969, p.10. NOW *?Cribroperidinium*. Originally *Gonyaulax;* subsequently *Leptodinium*.

var. *"kunzeviensis"* (Vozzhennikova, 1967). NOW *Gonyaulacysta kunzeviensis*. The existence of this variety was missed in previous editions of this index.

?perforobtusa Duxbury, 1977, p.39, pl.1, fig.1; text-fig.13. Hauterivian. Sarjeant, 1982, p.28 considered this to be a "provisionally accepted species".

"pila" (Gocht, 1959). NOW *?Leptodinium*.

piriformis (Conrad, 1941, p.9, pl.1, fig.G) Lentin and Williams, 1976, p.111. Maastrichtian; formerly *Palaeoperidinium*. Sarjeant 1967b, p.255 recommended transfer of this species to *Gonyaulacysta*.

"?plea" (Tasch, 1964) Lentin and Williams, 1976, p.43. NOW and formerly *Deflandrea*. Originally *Peridinium*. At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Gonyaulacysta*.

polythyris Davey, 1979b, p.556, pl.3, fig.1-3. Albian.

"pyra" (Drugg, 1967) Sarjeant, 1969, p.11. NOW *?Cribroperidinium;* formerly *Gonyaulax*.

rara Kar *et al.*, 1972, p.147, pl.1, fig.4-5. Tertiary. Stover and Evitt, 1978, p.159 considered this to be a "problematical species". Jain, 1982, p.52 considered that the name must be restricted to the holotype.

"sarjeantii" (Vozzhennikova, 1967) Sarjeant, 1969, p.11. NOW *?Cribroperidinium;* formerly *Gonyaulax*. O.C. See also *Millioudodinium* and *Rhynchodiniopsis*.

subsp. *"sphaerica"* (Vozzhennikova, 1967) Lentin and Williams, 1973, p.63. NOW *?Cribroperidinium sarjeantii* subsp. *sphaericum;* formerly *Gonyaulax sarjeanti* var. *sphaericum*. See also *Millioudodinium sarjeantii* subsp. *sphaericum* and *Rhynchodiniopsis sarjeantii* subsp. *sphaerica*.

"scarburghensis" Sarjeant, 1964c, p.472-473, *nom. nov. pro Gonyaulax areolata* Sarjeant, 1961a, p.95-96, pl.13, fig.13; text-fig.5. NOW *Acanthaulax*. See also *"Gonyaulacysta areolata"*.

"scottii" (Cookson and Eisenack, 1958) Sarjeant, 1969, p.11. NOW *?Cribroperidinium;* formerly *Gonyaulax*. See also *?Millioudodinium*. O.C.

"serrata" (Cookson and Eisenack, 1958) Sarjeant, 1969, p.11. NOW *Hystrichogonyaulax;* formerly *Gonyaulax*.

GONYAULACYSTA (cont'd)

"setcheyensis" (Sarjeant, 1976c). NOW *Rhynchodiniopsis*. See also *Leptodinium*.

"striata" (Clarke and Verdier, 1967). NOW *Pterodinium;* also formerly *Leptodinium*.

"strigosa" (Yu Jingxian, 1982). NOW *?Cribroperidinium*.

"?superornata" (W. Wetzel, 1967) Eisenack and Kjellström, 1971b, p.306g. NOW *Meiourogonyaulax*.

"systremmata" (Gitmez and Sarjeant, 1972). NOW *Cribroperidinium*. See also *Millioudodinium*.

teicha Davey, 1974, p.53-54, pl.4, fig.5-7. Early Barremian.

"?tenuiceras" (Eisenack, 1958) Sarjeant, 1969, p.11. NOW *Diacanthum;* formerly *Gonyaulax*. At the time of the transfer, Sarjeant, *op.cit.* questionably included this species in *Gonyaulacysta*.

"tenuicornuta" (Cookson and Eisenack, 1962b) Sarjeant, 1969, p.11. NOW and formerly *?Leptodinium*.

"tenuitabulata" (Gerlach, 1961) De Coninck, 1969, p.23. NOW *Cribroperidinium;* formerly *Gonyaulax*. See also *Millioudodinium*.

transparens (Sarjeant, 1959, p.334, pl.13, fig.3; text-fig.3) Sarjeant, 1969, p.11. Early Callovian; formerly *Gonyaulax*. Stover and Evitt, 1978, p.159 considered this to be a "problematical species".

variabilis (Pocock, 1972, p.100, pl.23, fig.14-16) Davey, 1979d, p.217. Late Bajocian; formerly *?Chytroeisphaeridia*.

"venusta" (Klement, 1960) Dodekova, 1971, p.11. NOW *Acanthaulax;* formerly *Gonyaulax*.

vozzhennikovae Sarjeant, 1982, p.33-34, pl.7, fig.8; pl.8, fig.9. Early Oxfordian.

"?wetzelii" (Lejeune-Carpentier, 1939) Sarjeant, 1969, p.11. NOW *Cribroperidinium;* formerly *Gonyaulax*. O.C. Stover and Evitt, 1978, p.159 considered this to be a "provisionally accepted species" of *Gonyaulacysta*.

"whatleyi" (Sarjeant, 1972). NOW *Tubotuberella*.

"whitei" (Sarjeant, 1966b). NOW *Rhynchodiniopsis*. See also *?Impagidinium*.

GONYAULAX Diesing, 1866, p.305,382. Modern genus defined from the motile stage. The current generic assignment of fossil dinoflagellates formerly included in *Gonyaulax* is given below.

"acanthosphaera" (Sarjeant, 1961a). NOW *?Meiourogonyaulax.*

"aceras" (Eisenack, 1958). NOW *Acanthaulax.*

"aculeata" (Klement, 1960). NOW *Acanthaulax.*

"amabilis" (Deflandre, 1939). NOW *?Leptodinium.*

"ambigua" (Deflandre, 1939). NOW *Leptodinium.*

"apionis" (Cookson and Eisenack, 1958). NOW *Cribroperidinium.*

"areolata" (Sarjeant, 1961a). NOW *Acanthaulax.*

"bulloidea" (Cookson and Eisenack, 1960b). NOW *Meiourogonyaulax.*

"caytonensis" (Sarjeant, 1959). NOW *Meiourogonyaulax.*

"chaloneri" (Sarjeant, 1963b). NOW *Rhaetogonyaulax rhaetica* subsp. *chaloneri.*

"cladophora" (Deflandre, 1938b). NOW *Hystrichogonyaulax.*

  subsp. *"cladophora"* (Deflandre, 1938b). NOW *Hystrichogonyaulax cladophora* subsp. *cladophora.*

  subsp. *"extensa"* (Klement, 1960). NOW *Hystrichogonyaulax cladophora* subsp. *extensa.*

  subsp. *"hemipolyedrica"* (Klement, 1960). NOW *Hystrichogonyaulax cladophora* subsp. *hemipolyedrica.*

  subsp. *"isovalvata"* (Klement, 1960). NOW *Hystrichogonyaulax cladophora* subsp. *isovalvata.*

"clathrata" (Cookson and Eisenack, 1960b). NOW *Leptodinium.*

"confusa" (Vozzhennikova, 1967). NOW *?Rhynchodiniopsis.*

"cornigera" (Valensi, 1953). NOW *Hystrichogonyaulax.*

"crassicornuta" (Klement, 1960). NOW *Rhynchodiniopsis.*

"cretacea" (Neale and Sarjeant, 1962). NOW *Gonyaulacysta.*

"crispa" (W. Wetzel, 1967). NOW *Acanthaulax.*

GONYAULAX (cont'd)

"cristulata" (Sarjeant, 1959). NOW *?Meiourogonyaulax.*

"culmula" (Norris, 1965). NOW *Dichadogonyaulax.*

"decapitata" (W. Wetzel, 1967). NOW *Meiourogonyaulax.*

"diaphanis" (Cookson and Eisenack, 1958). NOW *Cribroperidinium.*

"edwardsii" (Cookson and Eisenack, 1958). NOW *Cribroperidinium.*

"eisenackii" (Deflandre, 1938b). NOW *Gonyaulacysta.*

"eumorpha" (Cookson and Eisenack, 1960b). NOW *Leptodinium.*

"freakei" (Sarjeant, 1963c). NOW *Leptodinium.*

"giuseppei" (Morgenroth, 1966a). NOW *Cribroperidinium.*

  subsp. *"major"* (Morgenroth, 1966a). See *Cribroperidinium giuseppei.*

"granulata" (Klement, 1960). NOW *Meristaulax.*

"granuligera" (Klement, 1960). NOW *Cribroperidinium.* See also *Cryptarchaeodinium* and *Rhynchodiniopsis.*

"helicoidea" (Eisenack and Cookson, 1960). NOW *Gonyaulacysta.*

  subsp. *"cassidata"* (Eisenack and Cookson, 1960). NOW *Gonyaulacysta cassidata.*

    var. *"tuberculata"* (Vozzhennikova, 1967). NOW *Gonyaulacysta helicoidea* subsp. *tuberculata.*

"heslertonensis" (Neale and Sarjeant, 1962). NOW *Heslertonia.*

"hyalodermopsis" (Cookson and Eisenack, 1958). NOW *Rhynchodiniopsis.*

"jurassica" (Deflandre, 1938b). NOW *Gonyaulacysta.*

    var. *"longicornis"* (Deflandre, 1938b). NOW *Gonyaulacysta jurassica* subsp. *longicornis.*

"kostromiensis" (Vozzhennikova, 1967). NOW *Gonyaulacysta.*

"longicornis" (Downie, 1957). NOW *?Cribroperidinium.*

"mamillifera" (Deflandre, 1939). NOW *Leptodinium.*

***GONYAULAX* (cont'd)**

"margaritifera" (Cookson and Eisenack, 1960a). NOW *Impagidinium.*

"microceras" (Eisenack, 1958). NOW *Gonyaulacysta.*

"millioudii" (Sarjeant, 1963c). NOW *Leptodinium.*

"muderongensis" (Cookson and Eisenack, 1958). NOW *Cribroperidinium.*

"nannotrix" (Deflandre, 1939). NOW *?Rhynchodiniopsis.*

"nealei" (Sarjeant, 1962a). NOW *?Hystrichogonyaulax.*

"nuciformis" (Deflandre, 1938b) Sarjeant, 1962a, p.482-483. NOW *Apteodinium;* formerly *Palaeoperidinium.*

"obscura" (Lejeune-Carpentier, 1946). NOW *?Gonyaulacysta.*

"orthoceras" (Eisenack, 1958). NOW *Cribroperidinium.*

"pachyderma" (Deflandre, 1938b). NOW *Korystocysta.*

"paliuros" (Sarjeant, 1962a). NOW *?Acanthaulax.*

"pannonica" (Nagy, 1965). NOW *?Cribroperidinium.*

"perforans" (Cookson and Eisenack, 1958). NOW *?Cribroperidinium.*

"porosa" (Lejeune-Carpentier, 1946). NOW *Leptodinium.*

"pyra" (Drugg, 1967). NOW *?Cribroperidinium.*

"reticulata" (Nagy, 1969). NOW *Leptodinium.*

"rhaetica" (Sarjeant, 1963b). NOW *Rhaetogonyaulax.*

"sarjeantii" (Vozzhennikova, 1967). NOW *?Cribroperidinium.*

  var. *"sphaericum"* (Vozzhennikova, 1967). NOW *?Cribroperidinium sarjeantii* subsp. *sphaericum.*

"scottii" (Cookson and Eisenack, 1958). NOW *?Cribroperidinium.*

"serrata" (Cookson and Eisenack, 1958). NOW *Hystrichogonyaulax.*

"superornata" (W. Wetzel, 1967). NOW *Meiourogonyaulax.*

"tenuiceras" (Eisenack, 1958). NOW *Diacanthum.*

GONYAULAX **(cont'd)**

"*tenuitabulata*" (Gerlach, 1961). NOW *Cribroperidinium*.

"*transparens*" (Sarjeant, 1959). NOW *Gonyaulacysta*.

"*venusta*" (Klement, 1960). NOW *Acanthaulax*.

"*wetzelii*" (Lejeune-Carpentier, 1939). NOW *Cribroperidinium*.

GORKADINIUM Loeblich and Loeblich, 1966, p.93, *nom. subst. pro Tetrasphaera* Gorka, 1965.

**rarum* (Gorka, 1965, p.307, pl.2, fig.6a-b) Loeblich and Loeblich, 1966, p.93. Early Kimmeridgian; formerly *Tetrasphaera*. O.C.

GYMNODINIUM Stein, 1878, p.89-91,97. Modern genus defined from the motile stage. The current generic assignment of fossil dinoflagellates formerly included in *Gymnodinium* is given below.

"*albertii*" (Vozzhennikova, 1967). NOW *Dinogymnium vozzhennikovae*.

"*attadalense*" (Cookson and Eisenack, 1958). NOW *Scriniodinium*.

"*australiense*" (Deflandre and Cookson, 1955). NOW *Apteodinium*.

"*avellanum*" (Lejeune-Carpentier, 1951). NOW *Dinogymnium*.

"*cretaceum*" (Deflandre, 1935). NOW *Dinogymnium*.

"*crystallinum*" (Deflandre, 1938b). NOW *Scriniodinium*.

"*curvatum*" (Vozzhennikova, 1967). NOW *Dinogymnium*.

"*dabendorfense*" (Alberti, 1961). NOW *?Luxadinium*.

"*decorum*" (Deflandre, 1943). NOW *Dinogymnium*.

"*denticulatum*" (Alberti, 1961). NOW *Dinogymnium*.

"*digitus*" (Deflandre, 1935). NOW *Dinogymnium*.

var. "*crassum*" (Vozzhennikova, 1967). NOW *Dinogymnium digitus* subsp. *crassum*.

"*dorsispirale*" (Churchill and Sarjeant, 1963). NOW *Muiradinium*.

"*fehmarnense*" (Morgenroth, 1966a). NOW *?Diconodinium*.

GYMNODINIUM **(cont'd)**

"galeritum" (Deflandre, 1938b). NOW *Endoscrinium.*

"heterocostatum" (Deflandre, 1935). NOW *Dinogymnium.*

var. *"kolpaschevii"* (Vozzhennikova, 1967). NOW *Dinogymnium heterocostatum* subsp. *kolpaschevii.*

"hexagonum" (Deflandre-Rigaud, 1954). NOW *Dinogymnium.*

"hyalinum" (Vozzhennikova, 1967). NOW *Dinogymnium.*

"kasachstanicum" (Vozzhennikova, 1967). NOW *Dinogymnium.*

"laticinctum" (Deflandre, 1943). NOW *Dinogymnium.*

"longicornis" (Vozzhennikova, 1967). NOW *Dinogymnium.*

"luridum" (Deflandre, 1938b). NOW *Tubotuberella.*

"marthae" (Deflandre, 1943). NOW *Dinogymnium.*

"muticum" (Vozzhennikova, 1967). NOW *Dinogymnium.*

"nelsonense" (Cookson, 1956). NOW *Dinogymnium.*

"parvimarginatum" (Cookson and Eisenack, 1958). NOW *Scriniodinium.*

"pontis-mariae" (Deflandre, 1936b). NOW *Subtilisphaera.*

"sibiricum" (Vozzhennikova, 1967). NOW *Dinogymnium.*

"sphaerocephalum" (Vozzhennikova, 1967). NOW *Dinogymnium.*

var. *"laeve"* (Vozzhennikova, 1967). NOW *Dinogymnium sphaerocephalum* subsp. *laeve.*

"strombomorphum" (Deflandre, 1943). NOW *Dinogymnium.*

"torulosum" (Deflandre, 1943). NOW *?Scriniodinium.*

"ventriosum" (Alberti, 1961). NOW *Diconodinium.*

"westralium" (Cookson and Eisenack, 1958). NOW *Dinogymnium.*

H

HAFNIASPHAERA Hansen, 1977, p.13-14.

cryptovesiculata Hansen, 1977, p.14-15, fig.9-10,18C,E-F,19A-B. Danian.

fluens Hansen, 1977, p.16, fig.13-14,19C-D. Maastrichtian-Danian.

goodmanii Edwards, 1982, p.110,112-113, pl.1, fig.1-3,5-6,8-9. Early Eocene.

graciosa Hansen, 1977, p.15, fig.11-12,18B,D. Danian.

**hyalospinosa* Hansen, 1977, p.14, fig.7-8,18A. Danian.

septata (Cookson and Eisenack, 1967b, p.253, pl.42, fig.6-10) Hansen, 1977, p.16. Late Paleocene. Originally *Baltisphaeridium;* subsequently *Spiniferites*. See also *Achomosphaera*.

HALODINIUM Bujak, 1984, p.196.

**majus* Bujak, 1984, p.196, pl.4, fig.15-17. Pleistocene.

minus Bujak, 1984, p.196, pl.4, fig.18-20. Pleistocene.

HALOPHORIDIA Cookson and Eisenack, 1962a, p.271. Stover and Evitt, 1978, p.293 considered this to be probably an acritarch genus.

spinosa Ch. Singh, 1983, p.132-133, pl.45, fig.9-11. Early Cenomanian.

**xena* Cookson and Eisenack, 1962a, p.271, pl.37, fig.6-8. Albian-Cenomanian.

HAPSIDAULAX Sarjeant, 1975b, p.143-144.

**margarethae* Sarjeant, 1975b, p.144-147, pl.1a-d,2a-d; text-fig.1-3. Bathonian.

HAPSOCYSTA Davey, 1979b, p.556.

dictyota Davey, 1979b, p.557, pl.3, fig.5-10,13-14. Albian.

**peridictya* (Eisenack and Cookson, 1960, p.8, pl.3, fig.5-6) Davey, 1979b, p.556. Late Albian-Cenomanian; formerly *?Cannosphaeropsis*. The species was emended by Davey at the time of the transfer.

HASHENIA Yu Jingxian and Zhang Wangping, 1980, p.107.

**reticulata* Yu Jingxian and Zhang Wangping, 1980, p.107, pl.1, fig.17; pl.2, fig.1-2. Turonian-Maastrichtian.

HEBECYSTA Bujak and Fisher, 1976, p.64.

**brevicornuta* Bujak and Fisher, 1976, p.64, pl.9, fig.11-15; text-fig.6A-B. Norian.

HEIBERGELLA Bujak and Fisher, 1976, p.52,54.

aculeata Bujak and Fisher, 1976, p.56,58, pl.8, fig.14-20; text-fig.4D. Carnian-Norian.

**asymmetrica* Bujak and Fisher, 1976, p.54,56, pl.8, fig.1-8; text-fig.4A-B. Carnian-Norian.

circularis He Cheng-quan and Li Peng, 1981, p.65, pl.31, fig.1-2. Late Oligocene. If this is a correct generic assignment, then it would suggest that the species is reworked.

kendelbachia (Morbey, 1975, p.38, pl.14, fig.1-4; pl.17, fig.1-3) Lentin and Williams, 1981, p.127. Rhaetian; formerly *Rhombodella*. The transfer of this species to *Chytroeisphaeridia* by Stover and Evitt, 1978, p.29 was rejected by Lentin and Williams, 1981, p.127.

salebrosacea Bujak and Fisher, 1976, p.56, pl.8, fig.9-13; text-fig.4C. Carnian-Norian.

"HELIODINIUM" Alberti, 1961, p.33; emend. Sarjeant, 1966b, p.142. *Jr syn.* of *Hystrichodinium* Deflandre, 1935. Davey, 1974, p.54 transferred the type of the genus *Heliodinium, H. voigtii,* to *Hystrichodinium*. The remaining species *Heliodinium patriciae* Neale and Sarjeant, 1962, was transferred to *Hystrichodinium* by Lentin and Williams, 1975, p.2151. The retention of *Heliodinium* by Harker and Sarjeant, 1975, p.225 was rejected by Lentin and Williams, 1977b, p.72, since the difference in process construction between *Heliodinium* and *Hystrichodinium,* as specified by Sarjeant, 1966b, p.142, cannot be determined with certainty with the light microscope.

"HEMICYSTODINIUM" Wall, 1967, p.110. *Jr syn.* of *Polysphaeridium* according to Bujak *et al.*, 1980, p.34. The type species, *Hemicystodinium zoharyi,* and the species *H. congregatum* were transferred to *Polysphaeridium* by Bujak *et al.*, 1980, p.34. *Hemicystodinium zoharyi* subsp. *ktana* was transferred to *Polysphaeridium*. by Lentin and Williams, 1981, p.232.

"congregatum" (Stover, 1977). NOW *Polysphaeridium*.

"*HEMICYSTODINIUM*" (cont'd)

"*?taugourdeaui*" (Varma and Dangwal, 1964, p.68, pl.2, fig.9) Sarjeant and Stover, 1978, p.51. Eocene-Oligocene; formerly *Tenua.* At the time of the transfer, Sarjeant and Stover, *op.cit.* questionably included this species in *Hemicystodinium.* Sarjeant and Stover, 1978, p.51 suggested that *?Hemicystodinium taugourdeaui* may be conspecific with *Polysphaeridium zoharyi.* That view was accepted by Lentin and Williams, 1981, p.127. See also *Batiacasphaera.*

"**zoharyi*" (Rossignol, 1962) Wall, 1967, p.110. NOW *Polysphaeridium;* formerly *Hystrichosphaeridium.*

subsp. "*ktana*" (Rossignol, 1964) Lentin and Williams, 1973, p.67. NOW *Polysphaeridium subtile* subsp. *ktana;* formerly *Hystrichosphaeridium zoharyi* var. *ktana.* See also *Polysphaeridium zoharyi* subsp. *ktana.*

HEMIPLACOPHORA Cookson and Eisenack, 1965a, p.125.

**semilunifera* Cookson and Eisenack, 1965a, p.126, pl.14, fig.4-9,16. Late Eocene.

HEMISPHAERIDIUM Bujak *in* Bujak *et al.*, 1980, p.56.

**fenestratum* Bujak *in* Bujak *et al.*, 1980, p.56,58, pl.15, fig.7-9. Late Eocene.

"*HERENDEENIA*" Wiggins, 1969, p.145-146. *Jr syn.* of *Omatia* according to Stover and Evitt, 1978, p.280. These authors retained the type of the genus, *Herendeenia pisciformis,* in the genus *Omatia.*

HESLERTONIA Sarjeant, 1966b, p.133; emend. Duxbury, 1980, p.123.

cylindrata Yun, 1981, p.72, pl.8, fig.3,11; text-fig.15. Early Santonian.

**heslertonensis* (Neale and Sarjeant, 1962, p.440, pl.19, fig.5; pl.20, fig.5) Sarjeant, 1966b, p.133; emend. Duxbury, 1980, p.124. Hauterivian-Barremian; formerly *Gonyaulax.*

pellucida Gitmez, 1970, p.297-299, pl.4, fig.12; pl.14, fig.2; text-fig.26. Early Kimmeridgian.

regula Yun, 1981, p.72-73, pl.5, fig.12; pl.8, fig.1-2,4,8. Early Santonian.

striata (Cookson and Eisenack, 1960a, p.9, pl.3, fig.10-11) Norvick *in* Norvick and Burger, 1976, p.47. Cenomanian; formerly *Cymatiosphaera.*

teichophera (Sarjeant, 1961a, p.107-108, pl.15, fig.9; text-fig.9a-b) Sarjeant, 1976c, p.8. Oxfordian; formerly *Cymatiosphaera.*

HETERAULACACYSTA Drugg and Loeblich, 1967, p.183; emend Bujak *in* Bujak *et al.*, 1980, p.58.

**campanula* Drugg and Loeblich, 1967, p.183-184, pl.1, fig.6-8c; text-fig.2. Middle Eocene.

everriculata Islam, 1983a, p.237, pl.2, fig.9-10. Early Eocene.

"*fehmarnensis*" (Lentin and Williams, 1973). NOW *Dinopterygium*.

?*leptalea* Eaton, 1976, p.305-306, pl.21, fig.1-2. Middle-Late Eocene. Eaton, *op.cit.* questionably included this species in *Heteraulacacysta*.

porosa Bujak *in* Bujak *et al.*, 1980, p.62, pl.15, fig.10-13; text-fig.14B-C. Late Eocene.

verricula (Piasecki, 1980, p.66-67, pl.1, fig.4-8; pl.5, fig.5-6) Lentin and Williams, 1981, p.128. Late Miocene; formerly *Dinopterygium*.

HETEROSPHAERIDIUM Cookson and Eisenack, 1968, p.115; emend. Yun, 1981, p.45-46.

**conjunctum* Cookson and Eisenack, 1968, p.115; text-fig.4G-H. Santonian-Early Campanian.

cordiforme Yun, 1981, p.46-47, pl.3, fig.4,7,10,15. Early Santonian.

?*heteracanthum* (Deflandre and Cookson, 1955, p.276, pl.2, fig.5-6; text-fig. 40-41) Eisenack and Kjellström, 1971a, p.451. ?Late Cretaceous-Early Eocene. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium,* then *Cleistosphaeridium.* Stover and Evitt, 1978, p.52 considered this to be a "provisionally accepted species".

subsp. *sparsiprocessum* (Varma and Dangwal, 1964, p.64, pl.1, fig.7) Eisenack and Kjellström, 1971a, p.453. Eocene-Oligocene; formerly *Hystrichosphaeridium heteracanthum* subsp. *sparsiprocessum.*

spinaconjunctum Yun, 1981, p.47, pl.3, fig.8,11-12. Early Santonian.

verdieri Yun, 1981, p.48, pl.3, fig.3,5. Early Santonian.

HEXAGONIFERA Cookson and Eisenack, 1961a, p.73; emend. Cookson and Eisenack, 1962b, p.496; emend. Stover and Evitt, 1978, p.107-108.

"?*chlamydata*" (Cookson and Eisenack, 1962b). NOW *Leberidocysta.* Lentin and Williams, 1976, p.84, "questionably retained *H. chlamydata* in *Hexagonifera,* even though the species appears to have an apical archeopyle (Cookson and Eisenack, 1962b, pl.7, fig.1-3,6,8)."

"*cylindrica*" (Habib, 1970) Habib, 1972, p.378. Lentin and Williams, 1976, p.84 rejected the transfer of this species from *Prismatocystis* to *Hexagonifera* by Habib, *op.cit.*

HEXAGONIFERA (cont'd)

"defloccata" (Davey and Verdier, 1973). NOW *Leberidocysta.*

**glabra* Cookson and Eisenack, 1961a, p.74, pl.12, fig.9-13. Senonian.

"jurassica" (Gitmez and Sarjeant, 1972). NOW *Senoniasphaera.*

"?laticaudata" (Vozzhennikova, 1967). NOW *?Leberidocysta.* Lentin and Williams, 1976, p.85 recommended that the species name *H. laticaudata* not be used because of the extremely poor illustration of the holotype, which renders morphological elucidation impossible. These authors also questionably retained the species in *Hexagonifera.* Lentin and Williams, 1977b, p.74 questionably retained this species in *Hexagonifera,* since according to Jain and Taugourdeau-Lantz, 1973, p.64, the archeopyle is apical. The contention by Mehrotra and Sarjeant, 1984c, p.50, that this species should be retained in *?Hexagonifera,* is herein rejected and it is retained in *?Leberidocysta.*

"?scabrata" (Jain and Taugourdeau-Lantz, 1973). NOW *?Leberidocysta.* The contention by Mehrotra and Sarjeant, 1984c, p.50, that this species should be returned to *?Hexagonifera,* is herein rejected and it is retained in *?Leberidocysta.*

"suspecta" (Manum and Cookson, 1964). NOW *Trithyrodinium.*

"vermiculata" (Cookson and Eisenack, 1961a). NOW *Trithyrodinium.*

"HEXASPHAERA" Clarke and Verdier, 1967, p.42. Clarke *et al.*, 1968, p.181 considered this genus to be a *jr syn.* of *Callaiosphaeridium.* The type and single species of the genus *Hexasphaera, H. asymmetrica,* is included in *Callaiosphaeridium.*

HISTIOCYSTA Davey, 1969a, p.138.

outananensis Below, 1981a, p.55-56, pl.10, fig.18-20; pl.15, fig.8-9; text-fig. 54-58. Hauterivian.

**palla* Davey, 1969a, p.138-140, pl.1, fig.5-6; text-fig.14A-B. Cenomanian.

HISTIOPHORA Klement, 1960, p.51.

**ornata* Klement, 1960, p.51-53, pl.16, fig.11-14; text-fig.28-30. Late Jurassic.

HOMOTRYBLIUM Davey and Williams, 1966b, p.100.

abbreviatum Eaton, 1976, p.267-268, pl.10, fig.2-4. Early-Late Eocene.

aculeatum Williams, 1978, p.797, pl.4, fig.5-6,8-9. Eocene.

bifurcatum Caro, 1973, p.354,357, pl.2, fig.6. Middle Paleocene. Stover and Evitt, 1978, p.210 considered this to be a "problematical species".

***HOMOTRYBLIUM* (cont'd)**

caliculum Bujak *in* Bujak *et al.*, 1980, p.62,64, pl.16, fig.1. Late Eocene.

constrictum Islam, 1983c, p.86,88, pl.3, fig.1-2. Early Eocene.

deconinckii Islam, 1983b, p.340, pl.3, fig.1-3. Middle Eocene.

"distinctum" Salujha and Kindra, 1981, p.51, pl.2, fig.45. Jain and Garg, 1982, p.69 stated that this species is a *jr syn.* of *Spiniferites ramosus* subsp. *ramosus.*

floripes (Deflandre and Cookson, 1955, p.276, pl.7, fig.1-2,7) Stover, 1975, p.36. Early Tertiary. Originally *Hystrichosphaeridium;* subsequently *Cordosphaeridium.*

subsp. *breviradiatum* (Cookson and Eisenack, 1961b, p.44, pl.2, fig.10-11) Lentin and Williams, 1977b, p.75. Late Eocene. Originally *Hystrichosphaeridium floripes* subsp. *breviradiatum;* subsequently *Cordosphaeridium floripes* subsp. *breviradiatum.*

giganteum Salujha and Kindra, 1981, p.50-51, pl.2, fig.42. Early Paleocene. Jain and Garg, 1982, p.69 indicated that this species is based on a single, poorly preserved specimen and the name should be restricted to the holotype.

oceanicum Eaton, 1976, p.268, pl.10, fig.5-8. Middle-Late Eocene.

pallidum Davey and Williams, 1966b, p.102-103, pl.12, fig.4,6; text-fig.22. Early Eocene.

plectilum Drugg and Loeblich, 1967, p.184-186, pl.2, fig.1-9; text-fig.3. Oligocene. *Jr syn.* of *Homotryblium floripes* according to Bujak *in* Bujak *et al.*, 1980, p.64. Stover (pers. comm.) has studied the holotype of *Homotryblium floripes* and believes *Homotryblium plectilum* is a distinct and separate species.

suggestatum Islam, 1983a, p.237-238, pl.2, fig.1,5. Early Eocene.

tasmaniense Cookson and Eisenack, 1967a, p.133-134, pl.20, fig.1-2. Paleocene.

**tenuispinosum* Davey and Williams, 1966b, p.101-102, pl.4, fig.11; pl.12, fig. 1,5,7; text-fig.21. Early Eocene.

umbellatum Islam, 1983b, p.340, pl.3, fig.7-8. Early Eocene.

vallum Stover, 1977, p.79-80, pl.3, fig.45-53. Early Oligocene-Early Miocene.

variabile Bujak *in* Bujak *et al.*, 1980, p.64,66, pl.16, fig.4-9. Late Eocene.

HOROLOGINELLA Cookson and Eisenack, 1962a, p.271; emend. Stover and Evitt, 1978, p.53-54. Stover and Evitt, 1978, p.54 regarded only *H. lineata* as a dinoflagellate and referred to an anticipated paper which will remove all species but the type from *Horologinella.*

apiculata Cookson and Eisenack, 1962a, p.272, pl.37, fig.4. Campanian.

biconvexa Jiabo, 1978, p.95, pl.29, fig.20-21. Early Tertiary.

disparilis He Cheng-quan, 1984b, p.162-163, pl.8, fig.22. Tertiary.

?*extrema* Cookson and Eisenack, 1962a, p.272-273, pl.37, fig.10. Cenomanian. Cookson and Eisenack, *op.cit.* questionably included this species in *Horologinella.*

incurvata Cookson and Eisenack, 1962a, p.272, pl.37, fig.5. Early Eocene.

**lineata* Cookson and Eisenack, 1962a, p.272, pl.37, fig.1-3. Aptian-?Albian.

micirugis He Cheng-quan, 1984b, p.163, pl.10, fig.12-14; text-fig.2. Tertiary.

?*obliqua* Cookson and Eisenack, 1962a, p.273, pl.37, fig.9. ?Late Albian-Cenomanian. Cookson and Eisenack, *op.cit.* questionably included this species in *Horologinella.*

scabrosa He Cheng-quan, 1984b, p.162, pl.8, fig.20-21. Tertiary.

?*spinosa* Cookson, 1965a, p.89, pl.10, fig.10-12; pl.11, fig.10. Late Eocene. Cookson, *op.cit.* questionably included this species in *Horologinella.*

spinosigibberosa Brideaux and Fisher, 1976, p.22-24, pl.4, fig.9; pl.5, fig. 1-16. Late Oxfordian-?Portlandian.

HURUNUIA Wilson, 1984a, p.215-216.

**maxwellii* Wilson, 1984a, p.216-217, fig.2-11. Early Tithonian.

HYSTRICHODINIUM Deflandre, 1935, p.182; emend. Sarjeant, 1966b, p.140; emend. Clarke and Verdier, 1967, p.37-38. See also *Heliodinium* which is a *jr syn.* of this genus.

"*alatum*" (Cookson and Eisenack, 1962b). NOW *Xiphophoridium.*

"?*amphiacanthum*" (Cookson and Eisenack, 1958). NOW *Omatidium.* Stover and Evitt, 1978, p.161-162 considered this to be a "provisionally accepted species" of *Hystrichodinium.*

compactum Alberti, 1961, p.15, pl.9, fig.5-6. Valanginian.

?*dasys* Davey, 1969a, p.175-176, pl.10, fig.8-9. Cenomanian. Stover and Evitt, 1978, p.162 considered this to be a "provisionally accepted species".

***HYSTRICHODINIUM* (cont'd)**

furcatum Alberti, 1961, p.16, pl.9, fig.7-8. Hauterivian.

?infundibulum Jain *et al.*, 1975, p.11-12, pl.3, fig.35. Maastrichtian. Stover and Evitt, 1978, p.162 considered this to be a "provisionally accepted species".

isodiametricum (Cookson and Eisenack, 1958, p.38, pl.12, fig.11-12) Stover and Evitt, 1978, p.161. Campanian-Early Maastrichtian; formerly *Palaeohystrichophora*.

?lanceatum Davies, 1983, p.22-23, pl.7, fig.1-12; text-fig.18. Late Callovian-Tithonian. Davies, *op.cit.* questionably included this species in *Hystrichodinium*.

oligacanthum Deflandre and Cookson, 1955, p.255-257, pl.1, fig.1; text-fig.2-3. Albian.

"parvum" (Alberti, 1961). NOW *Cauca*.

patriciae (Neale and Sarjeant, 1962, p.451-452, pl.19, fig.3; text-fig.7) Lentin and Williams, 1975, p.2151. Hauterivian; formerly *Heliodinium*.

**pulchrum* Deflandre, 1935, p.229-230, pl.5, fig.1; text-fig.9-11. Senonian.

subsp. *densispinum* (Deflandre, 1936a, p.35-36, pl.9, fig.3) Lentin and Williams, 1973, p.70. Senonian; formerly *Hystrichodinium pulchrum* var. *densispinum*.

subsp. *globosum* (Deflandre, 1936a, p.35, pl.9, fig.1-2) Lentin and Williams, 1973, p.70. Senonian; formerly *Hystrichodinium pulchrum* var. *globosum*.

ramoides Alberti, 1961, p.15-16, pl.8, fig.11-13. Late Barremian.

"?telaspinosum" (Fisher and Riley, 1980). NOW *Kleithriasphaeridium*. Fisher and Riley, *op.cit.* questionably included this species in *Hystrichodinium*.

voigtii (Alberti, 1961, p.33, pl.8, fig.1-5; emend. Sarjeant, 1966b, p.142-144) Davey, 1974, p.54. Barremian-Early Aptian; formerly *Heliodinium*. O.C.

HYSTRICHOGONYAULAX Sarjeant, 1969, p.13-14.

"canadensis" (Pocock, 1972) Stover and Evitt, 1978, p.162. *Jr syn.* of *Hystrichogonyaulax cladophora* (Deflandre) Stover and Evitt according to Fisher and Riley, 1980, p.320. For full citation see *Gonyaulacysta canadensis*.

HYSTRICHOGONYAULAX **(cont'd)**

cladophora (Deflandre, 1938b, p.173-176, pl.7, fig.1-5; text-fig.5-6) Stover and Evitt, 1978, p.162. Early Oxfordian. Originally *Gonyaulax;* subsequently *Gonyaulacysta*. Lentin and Williams, 1981, p.132 rejected the transfer of this species to the genus *Rhynchodiniopsis* Deflandre by Below, 1981a, p.118. See also *Hystrichogonyaulax canadensis* which is a *jr syn.* of this species.

subsp. *cladophora* (Deflandre, 1938b, p.173-176, pl.7, fig.1-5; text-fig. 5-6) Stover and Evitt, 1978, p.162. Early Oxfordian. Originally *Gonyaulax cladophora* subsp. *cladophora;* subsequently *Gonyaulacysta cladophora* subsp. *cladophora*. Downie and Sarjeant, 1965, p.114 gave the incorrect citation *Gonyaulax cladophora* Deflandre subsp. *cladophora* Klement. Lentin and Williams, 1981, p.132 rejected the transfer of this subspecies to the genus *Rhynchodiniopsis* Deflandre by Below, 1981a, p.118.

subsp. *extensa* (Klement, 1960, p.36-37, pl.4, fig.1-4; text-fig.16) Stover and Evitt, 1978, p.162. Early Kimmeridgian. Originally *Gonyaulax cladophora* subsp. *extensa;* subsequently *Gonyaulacysta cladophora* subsp. *extensa*. Lentin and Williams, 1981, p.133 rejected the transfer of this subspecies to the genus *Rhynchodiniopsis* Deflandre by Below, 1981a, p.118. According to Sarjeant, 1984a, p.155, the holotype of this subspecies has broken into two halves and is no longer suitable for restudy.

subsp. *hemipolyedrica* (Klement, 1960, p.36, pl.3, fig.10-12; text-fig. 14-15) Stover and Evitt, 1978, p.162. Early Kimmeridgian. Originally *Gonyaulax cladophora* subsp. *hemipolyedrica;* subsequently *Gonyaulacysta cladophora* subsp. *hemipolyedrica*. Lentin and Williams, 1981, p.133 rejected the transfer of this subspecies to the genus *Rhynchodiniopsis* Deflandre by Below, 1981a, p.118. According to Sarjeant, 1984a, p.155, he could not locate the holotype of this subspecies on the type slide.

subsp. *isovalvata* (Klement, 1960, p.37-38, pl.4, fig.5-9; text-fig.17) Stover and Evitt, 1978, p.163. Early Kimmeridgian. Originally *Gonyaulax cladophora* subsp. *isovalvata;* subsequently *Gonyaulacysta cladophora* subsp. *isovalvata*. Lentin and Williams, 1981, p.133 rejected the transfer of this subspecies to the genus *Rhynchodiniopsis* Deflandre by Below, 1981a, p.118.

"*corioides*" (Benedek, 1972). NOW *Phthanoperidinium*. Stover and Evitt, 1978, p.118 considered this species to be a *jr syn.* of *Phthanoperidinium comatum*. Benedek and Sarjeant, 1981, p.328-330 refuted this.

**cornigera* (Valensi, 1953, p.27, pl.1, fig.4,8,10; pl.2, fig.1-2; pl.13, fig.5; text-fig.2a) Sarjeant, 1969, p.14. Bathonian; formerly *Gonyaulax*. Woollam, 1983, p.193 suggested that this species may be conspecific with *Ctenidodinium combazii* Dupin.

HYSTRICHOGONYAULAX (cont'd)

"crispa" (W. Wetzel, 1967) Sarjeant, 1980b, p.119. NOW *Acanthaulax*. Originally *Gonyaulax;* subsequently *Gonyaulacysta,* then *Hystrichogonyaulax*. See also *Cribroperidinium*. The species was emended by Sarjeant, *op.cit.* at the time of the transfer.

italica (Corradini, 1973, p.132-133, pl.19, fig.8a-b; pl.33, fig.5a-b; text-fig. 3) Helenes, 1984, p.132. Late Cretaceous-Paleocene. Originally *Gonyaulacysta;* subsequently *?Millioudodinium*.

?nealei (Sarjeant, 1962a, p.480, pl.69, fig.1; text-fig.2) Sarjeant, 1969, p.14. Oxfordian; formerly *Gonyaulax*. Stover and Evitt, 1978, p.163 considered this to be a "provisionally accepted species".

pectinigera (Gocht, 1970b, p.138-139, pl.33, fig.1-4; text-fig.11) Stover and Evitt, 1978, p.163; emend. Fensome, 1979, p.43 (as *Gonyaulacysta pectinigera)*. Early Bathonian; formerly *Leptodinium subtile* subsp. *pectinigerum*. See also *Leptodinium pectinigerum*. Stover and Evitt, 1978, p.163 raised this taxon to the species level.

pennata (Riley *in* Fisher and Riley, 1980, p.321-322, pl.1, fig.10-11) Lentin and Williams, 1981, p.133. Volgian; formerly *Gonyaulacysta*. See also *Millioudodinium*.

"polytrix" (Benedek, 1972). NOW *?Phthanoperidinium*.

regalis (Gocht, 1970b, p.139-140, pl.33, fig.5-7; text-fig.10) Stover and Evitt, 1978, p.163. Early Bathonian; formerly *Leptodinium*.

saepita (Ashraf, 1979, p.128, pl.2, fig.27; pl.3, fig.1-3,5) Lentin and Williams, 1981, p.134. Late Jurassic (Malm); formerly *Leptodinium*.

serrata (Cookson and Eisenack, 1958, p.34, pl.3, fig.2; text-fig.12-14) Stover and Evitt, 1978, p.163. Late Jurassic-Neocomian. Originally *Gonyaulax;* subsequently *Gonyaulacysta*.

"HYSTRICHOKIBOTIUM" Klumpp, 1953, p.387. Gocht, 1969, p.32 considered this genus to be a *jr syn.* of *"Hystrichosphaera"*. Accordingly, he transferred the type of the genus, *Hystrichokibotium pseudofurcatum,* to *Hystrichosphaera*. Subsequently Sarjeant, 1970, p.76 transferred *Hystrichosphaera pseudofurcata* to *Spiniferites*.

"trabeculiferum" (Deflandre and Cookson, 1955). NOW *?Spiniferites*.

HYSTRICHOKOLPOMA Klumpp, 1953, p.388; emend. Williams and Downie, 1966a, p.176.

"biformoides" (Eisenack, 1954) Morgenroth, 1966a, p.28. NOW *Achilleodinium*. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium*.

HYSTRICHOKOLPOMA (cont'd)

bulbosum (Ehrenberg, 1838, pl.1, fig.17) Morgenroth, 1968, p.546-547. Danian. Originally *Xanthidium;* subsequently *Ovum hispidum,* then *Hystrichosphaera,* then *Hystrichosphaeridium,* then *Baltisphaeridium.* Lentin and Williams, 1981, p.134 rejected the contention by Stover and Evitt, 1978, p.55 that *H. bulbosum* is a *jr syn.* of *Hystrichosphaeridium tubiferum.*

subsp. *"turgidum"* (Williams and Downie, 1966a) Lentin and Williams, 1981, p.134. This combination was erroneously made by Lentin and Williams, 1981, p.134, when the subspecies should have been placed under *Hystrichokolpoma cinctum.*

**cinctum* Klumpp, 1953, p.389, pl.17, fig.3-5. Late Eocene. See also *Hystrichokolpoma eisenackii* which is a *jr syn.* of this species.

subsp. *turgidum* (Williams and Downie, 1966a) *comb. nov.* 1966a *Hystrichokolpoma eisenackii* var. *turgidum* Williams and Downie, p.178-179, pl.17, fig.5. Early Eocene. Also formerly *Hystrichokolpoma eisenackii* subsp. *turgidum.* Lentin and Williams, 1981, p.134 inadvertently placed this subspecies under *Hystrichokolpoma bulbosum* when they made the new combination.

"circumtabulatum" (Drugg, 1967) Schumacker-Lambry, 1978, p.42. The transfer of this species from the genus *Eisenackia* to the genus *Hystrichokolpoma* was rejected by Lentin and Williams, 1981, p.94 and the species retained in *Alisocysta.*

"clavigerum" (Deflandre, 1937b) Williams and Downie, 1969, p.17. NOW *Florentinia;* originally *Hystrichosphaeridium.*

crassipes (Reade, 1839, pl.9, fig.2-5) Lejeune-Carpentier and Sarjeant, 1981, p.10. Late Cretaceous. Originally *Xanthidium;* subsequently *Hystrichosphaeridium,* then *?Litosphaeridium.* At the time of the transfer, Lejeune-Carpentier and Sarjeant, *op.cit.* emended the specific diagnosis.

denticulatum Matsuoka, 1974, p.330-331, pl.44, fig.3-5. Early-Middle Miocene. O.C.

"eisenackii" Williams and Downie, 1966a, p.176-178, pl.17, fig.1-3; text-fig.46. Early Eocene. O.C. *Jr syn.* of *Hystrichokolpoma cinctum* according to Damassa, 1979a, p.823-824.

subsp. *"turgidum"* (Williams and Downie, 1966a) Lentin and Williams, 1973, p.71. NOW *Hystrichokolpoma cinctum* subsp. *turgidum;* formerly *Hystrichokolpoma eisenackii* var. *turgidum.*

ellipticum Matsuoka, 1974, p.330, pl.44, fig.2. Early-Middle Miocene. O.C.

HYSTRICHOKOLPOMA (cont'd)

"*fenestreconum*" (May, 1980). NOW *Litosphaeridium*.

"*ferox*" (Deflandre, 1937b) Davey, 1969a, p.159. NOW *Florentinia*.

"*?fimbriatum*" (Morgenroth, 1968). NOW *Conneximura*. Morgenroth, *op.cit.* questionably included this species in *Hystrichokolpoma*.

granulatum Eaton, 1976, p.269-270, pl.10, fig.11-13; text-fig.15. Early-Middle Eocene. O.C.

indicum Salujha and Kindra, 1981, p.52, pl.3, fig.53-54. Early Paleocene. Jain and Garg, 1982, p.69 stated that this species is based on a single, broken, poorly preserved specimen of unknown affinity and the name should be restricted to the holotype.

manipulatum Islam, 1983a, p.238, pl.3, fig.1-2. Early Eocene.

mentitum McLean, 1974, p.68-69, pl.8, fig.1-5; text-fig.1B. Late Paleocene. The contention that this species is a *jr syn.* of *Alisocysta circumtabulata* by Schumacker-Lambry, 1978, p.42 was rejected by Lentin and Williams, 1981, p.135, because of the distinct morphological differences between the two species.

okinawaium Matsuoka, 1979, p.54,56-57, pl.1, fig.6; pl.2, fig.1-4; text-fig. 4-5. Early Pleistocene.

pacificum Matsuoka, 1979, p.51,53-54, pl.1, fig.1-5; text-fig.3,5. Early Pleistocene.

?petasatum Islam, 1983b, p.340, pl.3, fig.4-5. Early-Middle Eocene. Islam, *op.cit.* questionably included this species in *Hystrichokolpoma*.

poculum Maier, 1959, p.312-313, pl.31, fig.3; emend. Sarjeant, 1983, p.104-105. Middle Miocene.

rigaudiae Deflandre and Cookson, 1955, p.279-281, pl.6, fig.6,10; text-fig.42. Eocene-Miocene. O.C. See also *Galea xiphea* and *Hystrichosphaeridium stellatum* which are *jr synonyms* of this species.

subsp. *granulosa* Jain and Tandon, 1981, p.11, pl.1, fig.5. Middle Eocene. O.C. The original spelling of this name contained a typographical error which is herein corrected.

"*robustum*" (Salujha and Kindra, 1981). NOW *?Amphorosphaeridium*.

salacium Eaton, 1976, p.271-272, pl.11, fig.1-3; text-fig.16. Early-Late Eocene. O.C.

HYSTRICHOKOLPOMA **(cont'd)**

"sequanaportus" Deflandre and Deflandre-Rigaud, 1958, cards 1352-1353, 4 figs. Late Cretaceous. Stover and Evitt, 1978, p.55 considered this to be an invalid *species*.

torquatum Damassa, 1979a, p.825-826, pl.3, fig.1-8; pl.4, fig.9-11; text-fig. 7. Early-Middle Eocene.

tumescens McLean, 1974, p.66,68, pl.8, fig.6-9; text-fig.1A. Late Paleocene.

unispinum Williams and Downie, 1966a, p.179-180, pl.17, fig.6-7. Early Eocene.

"?xipheum" (Maier, 1959) Davey and Williams, 1969, p.5. See *"Galea xiphea"*. At the time of the transfer, Davey and Williams, *op.cit.* questionably included this species in *Hystrichokolpoma*.

"HYSTRICHOSPHAERA" O. Wetzel, 1933b, p.33 *ex* Deflandre, 1937b, p.61. *Jr syn.* of *Spiniferites* according to Sarjeant, 1970, p.75. All species with the exception of those listed below have been transferred to *Spiniferites*, without any change in rank.

"biformis" (Wiesner, 1936). NOW *Hystrichosphaeridium*.

"borussica" (Eisenack, 1954). NOW *Rottnestia*.

"buccina" (Davey and Williams, 1966a). *Jr syn.* of *Spiniferites pseudofurcatus* (Klumpp) Sarjeant. See discussion under *"Spiniferites buccinus"*.

"bulbosa" (Ehrenberg, 1838) O. Wetzel, 1933b, p.40. NOW *Hystrichokolpoma*.

"ceratioides" (Deflandre, 1937b). NOW *Xenascus*.

"cingulata" (O. Wetzel, 1933b) Deflandre and Cookson, 1955, p.267. NOW *Pterodinium*; formerly *Cymatiosphaera*.

var. *"cingulata"* (O. Wetzel, 1933b). NOW *Pterodinium cingulatum* subsp. *cingulatum*.

var. *"granulata"* (Clarke and Verdier, 1967). NOW *Pterodinium cingulatum* subsp. *granulatum*.

var. *"reticulata"* (Davey and Williams, 1966a). NOW *Pterodinium cingulatum* subsp. *reticulatum*.

"clavigera" (Deflandre, 1937b). NOW *Florentinia*.

"crassipellis" (Deflandre and Cookson, 1955). NOW *Achomosphaera*.

"cruciata" (O. Wetzel, 1933b). NOW *Hystrichosphaeridium*.

"HYSTRICHOSPHAERA" (cont'd)

"furcata" (Ehrenberg, 1838) O. Wetzel, 1933b, p.34. *Jr syn.* of *Spiniferites ramosus*. See discussion under *"Spiniferites furcatus"*.

var. *"membranacea"* (Rossignol, 1964). NOW *Spiniferites membranaceus*.

var. *"pachyderma"* (Rossignol, 1964). NOW *Spiniferites pachydermus*.

"heterostylis" (Heisecke, 1970). NOW *Achomosphaera*.

"hirsuta" (Ehrenberg, 1838) O. Wetzel, 1933b, p.47. NOW *?Operculodinium*. Originally *Xanthidium*.

forma *"minor"* (O. Wetzel, 1933b). NOW *?Coronifera striolata* subsp. *minor*.

forma *"varians"* (O. Wetzel, 1933b). NOW *Coronifera striolata* subsp. *varians*.

incerta (Klumpp, 1953) Morgenroth, 1966a, p.15. NOW *Spiniferites*.

"intermedia" (O. Wetzel, 1933b). NOW *Hystrichosphaeridium*.

"membranaceus" (Rossignol, 1964) Wall, 1967, p.102. NOW *Spiniferites*.

"ovum" (Deflandre, 1935) Deflandre, 1937b, p.67. NOW *Hystrichosphaeropsis*.

"paradoxa" (Cookson and Eisenack, 1968). NOW *Spiniferites*.

"penicillata" (Ehrenberg, 1843) O. Wetzel, 1933b, p.41. NOW *Systematophora*.

forma *"coronata"* (O. Wetzel, 1933b). NOW *Areoligera coronata*.

forma *"medusettiformis"* (O. Wetzel, 1933b). See *Areoligera medusettiformis*.

forma *"rhizopodiphora"* (O. Wetzel, 1933b). See *Areoligera rhizopodiphora*.

"pilosa" (Ehrenberg, 1854) O. Wetzel, 1933b, p.43. NOW *Sentusidinium*.

forma *"nana"* (O. Wetzel, 1933b). NOW *Sentusidinium pilosum*.

"pseudofurcata" (Klumpp, 1953) Gocht, 1969, p.32. NOW *Spiniferites*; formerly *Hystrichokibotium*.

"pseudofurcata" (Varma and Dangwal, 1964). NOW *Spiniferites varmae*.

"salpingophora" (Deflandre, 1935). NOW *Hystrichosphaeridium*.

"HYSTRICHOSPHAERA" **(cont'd)**

"sergipensis" (Regali *et al.*, 1974). NOW *?Hystrichosphaeridium*.

"tenuicapillata" (O. Wetzel, 1933b). NOW *Areoligera*.

forma *"irregularis"* (O. Wetzel, 1933b). See *Areoligera tenuicapillata* subsp. *irregularis*.

forma *"pinopallina"* (O. Wetzel, 1933b). NOW *Areoligera tenuicapillata* subsp. *pinopallina*.

forma *"turbilineata"* (O. Wetzel, 1933b). NOW *Areoligera tenuicapillata* subsp. *turbilineata*.

"tertiaria" (Eisenack and Gocht, 1960). *Jr syn.* of *Spiniferites pseudofurcatus*. For complete citation see *Spiniferites tertiarius*.

var. *"obliqua"* (Wall, 1967). NOW *Spiniferites pseudofurcatus* subsp. *obliquus*.

"tubifera" (Ehrenberg, 1838) O. Wetzel, 1933b, p.40. NOW *Hystrichosphaeridium*; originally *Xanthidium*.

"xanthiopyxides" (O. Wetzel, 1933b). NOW *Tanyosphaeridium*.

HYSTRICHOSPHAERIDIUM Deflandre, 1937b, p.68; emend. Davey and Williams, 1966b, p.55-56.

"aemulum" (Deflandre, 1938b). NOW *Rigaudella*.

"alagoense" (Regali *et al.*, 1974). NOW *?Surculosphaeridium*.

"albertense" (Pocock, 1962). NOW *Oligosphaeridium*.

"alcicornu" (Eisenack, 1954). NOW *Achomosphaera*.

"amalthei" (W. Wetzel, 1966). NOW *?Dapsilidinium*.

"ancoriferum" (Cookson and Eisenack, 1960a). NOW *Cleistosphaeridium*.

"anthophorum" (Cookson and Eisenack, 1958). NOW *Stiphrosphaeridium*.

aquitanicum Deunff, 1961, p.39-40, pl.2, fig.12-13. Cretaceous. Stover and Evitt, 1978, p.56 considered this to be a "problematical species".

"aracajuense" (Regali *et al.*, 1974). NOW *Spiniferites*.

arborispinum Davey and Williams, 1966b, p.61, pl.9, fig.5,10. Early-Middle Barremian.

HYSTRICHOSPHAERIDIUM (cont'd)

"armatum" (Deflandre, 1937b). NOW *Cleistosphaeridium.*

"aruncium" Tasch, 1964, p.193, pl.3, fig.12. Albian. Stover and Evitt, 1978, p.267 considered this species to be a synonym of *"Kiokansium unituberculatum".*

"arundum" (Eisenack and Cookson, 1960). NOW *Litosphaeridium.*

"ashdodense" (Rossignol, 1962). *Jr syn.* of *Lingulodinium machaerophorum* according to Wall, 1967, p.109. For full citation see *"Cleistosphaeridium ashdodense."*

"asperum" (Maier, 1959). NOW *?Polysphaeridium.*

assamicum Sah *et al.*, 1970, p.146-147, pl.2, fig.20-21. Late Cretaceous. Stover and Evitt, 1978, p.56 considered this to be a "problematical species". Based on re-examination of the specimens, Jain, 1982, p.52 stated that this is an "unidentifiable species". Therefore, the name should be restricted to the holotype.

"asterigerum" (Gocht, 1959). NOW *?Oligosphaeridium.*

"asterium" (Eaton, 1976). NOW *Melitasphaeridium.*

"asymmetricum" (Deflandre and Courteville, 1939). NOW *Callaiosphaeridium.*

atlasiense Below, 1982c, p.12, pl.3, fig.2; text-fig.2. Albian.

?attadalense Cookson and Eisenack, 1982, p.45, pl.4, fig.20. Early Cenomanian. Cookson and Eisenack, *op.cit.* questionably included this species in *Hystrichosphaeridium.*

"bahiaense" (Regali *et al.*, 1974). NOW *?Cleistosphaeridium.*

biforme (Wiesner, 1936, p.154, pl.7, fig.9) Deflandre, 1946a, card 881. Late Cretaceous; formerly *Hystrichosphaera.* Stover and Evitt,1978, p.56 considered this to be a "problematical species".

"biformoides" (Eisenack, 1954). NOW *Achilleodinium.*

bowerbankii Davey and Williams, 1966b, p.69-70, pl.8, fig.1,4. Cenomanian. O.C.

"?breviatum" Morgenroth, 1966a, p.29, pl.7, fig.11-12. Early Eocene. Stover and Evitt, 1978, p.56 considered this to be a "provisionally accepted species". Islam, 1983b, p.343 considered this species to be a *jr syn.* of *Polysphaeridium subtile* subsp. *ktana.*

HYSTRICHOSPHAERIDIUM (cont'd)

"brideauxii" Lentin and Williams, 1973, p.74 (*nom. subst. pro Hystrichosphaeridium cylindratum* Brideaux, 1971, p.91-92, pl.26, fig.69-70; pl.27, fig.74; text-fig.9c, *non Hystrichosphaeridium cylindratum* Morgenroth, 1966a). Harker and Sarjeant, 1975, p.225-226 considered this species to be a *jr syn.* of *Hystrichosphaeridium cooksoniae* Ch. Singh.

"bulbosum" (Ehrenberg, 1838) Deflandre, 1937b, p.80. NOW *Hystrichokolpoma.*

"caiobense" (Regali *et al.*, 1974). NOW *Apectodinium.*

calvum Tasch, 1964, p.193, pl.1, fig.21. Albian. Stover and Evitt, 1978, p.56 considered this to be a "problematical species".

cambayense Varma and Dangwal, 1964, p.63, pl.1, fig.1-2. Eocene-Oligocene. Stover and Evitt, 1978, p.56 considered this to be a "problematical species".

"caminuspinum" (Wall, 1965a). NOW *?Dapsilidinium.*

"cantharellum" (Brosius, 1963). NOW *Cordosphaeridium.*

"capitatum" (Cookson and Eisenack, 1960b). NOW *Prolixosphaeridium.*

"caulleryi" (Deflandre, 1938b). NOW *Adnatosphaeridium.*

"centrocarpum" (Deflandre and Cookson, 1955). NOW *Operculodinium.*

var. *"teokides"* (Srivastava and Banerjee, 1969). NOW *Operculodinium centrocarpum* subsp. *teokides.*

"choanophorum" (Deflandre and Cookson, 1955). NOW *Melitasphaeridium.*

"claviculorum" (Deflandre, 1938b). Sarjeant, 1968, p.223 transferred this species to the acritarch genus *Solisphaeridium.* Stover and Evitt, 1978, p.56 considered this to be a "problematical species" of *Hystrichosphaeridium.*

"clavigerum" (Deflandre, 1937b). NOW *Florentinia.*

"coelenteratum" (Tasch, 1964). See *?Oligosphaeridium coelenteratum.*

"colligerum" (Deflandre and Cookson, 1955). NOW *Diphyes.*

collum Tasch, 1964, p.194, pl.2, fig.7, 16. Albian. Stover and Evitt, 1978, p.56 considered this to be a "problematical species".

"complex" (White, 1842) Deflandre, 1946b, p.111. NOW *Oligosphaeridium.*

conispiniferum Yun, 1981, p.30-31, pl.2, fig.4-6,9. Early Santonian.

HYSTRICHOSPHAERIDIUM **(cont'd)**

"cooksoniae" (Singh, 1971). NOW *Florentinia.*

"coronatum" (O. Wetzel, 1933b). NOW *Areoligera.*

"costatum" (Davey and Williams, 1966b). See *Compositosphaeridium costatum.*

"crassipes" (Reade, 1839) Lejeune-Carpentier, 1941, p.79-80. NOW *Hystrichokolpoma;* formerly *Xanthidium.* See also *?Litosphaeridium.*

"cribrotubiferum" (Sarjeant, 1960a). NOW *Surculosphaeridium.*

cruciatum (O. Wetzel. 1933b, p.48, pl.4, fig.30) Deflandre, 1937b, p.79. Late Cretaceous; formerly *Hystrichosphaera.* Stover and Evitt, 1978, p.56 considered this to be a "problematical species".

cylindratum Morgenroth, 1966a, p.30, pl.8, fig.3-4. Early Eocene.

"cylindratum" Brideaux, 1971, p.91-92, pl.26, fig.69-70; pl.27, fig.74; text-fig.9c. *Jr hom., nom subst. Hystrichosphaeridium "brideauxii"* Lentin and Williams, 1973, p.74. This species is a *jr syn.* of *Hystrichosphaeridium* (now *Florentinia) cooksoniae* according to Harker and Sarjeant, 1975, p.225-226.

"danicum" (W. Wetzel, 1952) W. Wetzel, 1955, p.34. NOW *Achomosphaera;* formerly *Areoligera.*

"deanei" (Davey and Williams, 1966b). NOW *Florentinia.*

"deflandrei" (Valensi, 1947). NOW *?Dapsilidinium.*

"dictyophorum" (Cookson and Eisenack, 1958). NOW *Stiphrosphaeridium.*

"dictyostilum" (Menendez, 1965). NOW *Areosphaeridium.* Eaton, 1971, p.359 considered this species to be a *jr syn.* of *Areosphaeridium diktyoplokus* (Klumpp) Eaton.

difficile Manum and Cookson, 1964, p.12-14, pl.3, fig.1-3,7. Cenomanian.

"diktyoplokus" (Klumpp, 1953). NOW *Areosphaeridium.*

subsp. *"latum"* (Klumpp, 1953). NOW *Cordosphaeridium latum.*

"dispare" (Tasch, 1964). See *?Oligosphaeridium dispare.*

"divergens" (Eisenack, 1954). NOW *Operculodinium.*

dowlingii Harland, 1973, p.681, pl.85, fig.1; text-fig.10. Late Campanian.

"eccentrum" Tasch, 1964, p.194, pl.1, fig.6; pl.2, fig.9. Albian. Stover and Evitt, 1978, p.267 considered this species to be a synonym of *"Kiokansium unituberculatum"*.

echinatum Menendez, 1965, p.12-13, pl.2, fig.9. Late Cretaceous. Stover and Evitt, 1978, p.56 considered this to be a "problematical species".

"echinoides" Maier, 1959, p.318-319, pl.32, fig.5-6. *Jr syn.* of *Spiniferites ramosus* according to Sarjeant, 1983, p.91-92.

"ehrenbergii" (Deflandre, 1947c). NOW *Cleistosphaeridium.*

"elegantulum" Lejeune-Carpentier, 1940, p.22; text-fig.11-12. Turonian-Senonian. *Jr syn.* of *Oligosphaeridium complex* (White) Davey and Williams according to Deflandre, 1946b, p.111.

"ellipticum" (Cookson, 1965a). NOW *Distatodinium.*

"entomium" Tasch, 1964, p.193, pl.3, fig.15. Albian. Stover and Evitt, 1978, p.267 considered this species to be a synonym of *"Kiokansium unituberculatum"*.

"eoinodes" (Eisenack, 1958). NOW *Kleithriasphaeridium.*

"equispinosum" Tasch, 1963, p.336, pl.1, fig.12. Early Permian. This is a specimen of the spore *Raistrickia* according to Stover and Evitt, 1978, p.265.

"erectum" (Manum and Cookson, 1964). NOW *?Kiokansium.*

"espiritosantense" (Regali *et al.*, 1974). NOW *Areoligera.*

"fabium" (Tasch, 1964). Stover and Evitt, 1978, p.267 considered this species to be a synonym of *"Kiokansium unituberculatum"*. For full citation see *"?Polysphaeridium fabium"*.

"ferox" (Deflandre, 1937b). NOW *Florentinia.*

"floripes" (Deflandre and Cookson, 1955). NOW *Homotryblium.*

subsp. *"breviradiatum"* (Cookson and Eisenack, 1961b). NOW *Homotryblium floripes* subsp. *breviradiatum.*

"flosculus" (Deflandre, 1937b). NOW *?Florentinia.*

"follium" (Tasch, 1964). Stover and Evitt, 1978, p.267 considered this species to be a synonym of *"Kiokansium unituberculatum"*. For full citation see *"Polysphaeridium follium"*.

HYSTRICHOSPHAERIDIUM **(cont'd)**

"fucosum" (Valensi, 1955a) Downie and Sarjeant, 1965, p.120. NOW *?Dapsilidinium.*

"geometricum" (Pastiels, 1948, p.41, pl.4, fig.1-11). NOW *Apectodinium homomorphum.*

gliwicense Macko, 1957, p.113, pl.71, fig.11-15; pl.72, fig.1. Miocene. Stover and Evitt, 1978, p.56 considered this to be a "problematical species".

"grallaeforme" (Brosius, 1963). NOW *Achomosphaera.*

"grande" Salujha *et al.*, 1969, p. , pl.4, fig.59-60. Early Eocene. Jain, 1982, p.53 considered this species to be a *Homotryblium* sp. due to the presence of striations on the processes. Jain, *op.cit.* made no mention of archeopyle type; he did, however, recommend rejection of the name.

"heteracanthum" (Deflandre and Cookson, 1955). NOW *?Heterosphaeridium.*

subsp. *"sparsiprocessum"* (Varma and Dangwal, 1964) NOW *Heterosphaeridium heteracanthum* subsp. *sparsiprocessum.*

hillii (Merrill, 1895, p.17; text-fig.21) Sarjeant, 1964b, p.175. Early Cretaceous; formerly *Geodia.* O.C. Stover and Evitt, 1978, p.56 considered this to be a "problematical species".

"hirsutum" (Ehrenberg, 1838) Deflandre, 1938b, p.78. *Nom. nud.;* see Sarjeant, 1984c, p.131-132. See *?Operculodinium.*

"hirundo" (Eisenack, 1958). NOW *?Cordosphaeridium.*

"horridum" (Deflandre, 1937b). NOW *Baltisphaeridium,* an acritarch.

"huguonioti" (Valensi, 1955a). NOW *Cleistosphaeridium.*

"inodes" (Klumpp, 1953). NOW *Cordosphaeridium.*

subsp. *"gracile"* (Eisenack, 1954). NOW *Cordosphaeridium gracile.*

intermedium (O. Wetzel, 1933b, p.46, text-fig.14) Deflandre, 1937b, p.77-78. ?Late Cretaceous; formerly *Hystrichosphaera.* Stover and Evitt, 1978, p.56 considered this to be a "problematical species". Matsuoka, 1983a, p.16 considered the species to be a possible *syn.* of *Polysphaeridium zoharyi* (Rossignol) Bujak *et al.* Pending re-examination of the holotype, we find this unacceptable.

HYSTRICHOSPHAERIDIUM (cont'd)

"irregulare" (Merrill, 1895) Sarjeant, 1964b, p.175. NOW *Hystrichosphaeridium speciale;* formerly *Geodia.* Stover and Evitt, 1978, p.56 considered this to be a "problematical species". When Sarjeant, *op.cit.* transferred *Geodia irregularis* to *Hystrichosphaeridium,* he created a *jr hom.* of *Hystrichosphaeridium irregulare* Pocock, and thus he created an illegitimate combination. *H. irregulare* (Merrill) Sarjeant is therefore given the new specific epithet, *H. speciale,* in this paper.

"irregulare" (Pocock, 1962). NOW *Oligosphaeridium.*

"isocalamum" (Deflandre and Cookson, 1955). NOW *Tanyosphaeridium.*

"israelianum" (Rossignol, 1962). NOW *Operculodinium.*

"kiowanum" Tasch, 1964, p.193, pl.2, fig.1. Albian. Stover and Evitt, 1978, p.267 considered this species to be a synonym of *"Kiokansium unituberculatum".*

"langii" (Wall, 1965a). NOW *?Dapsilidinium.*

lateraliprocessum Srivastava and Banerjee, 1969, p.102, pl.1, fig.1-3. Eocene. Stover and Evitt, 1978, p.56 considered this to be a "problematical species".

latirictum Davey and Williams, 1966b, p.66-67, pl.10, fig.8. Early Eocene.

"leonardianum" Tasch, 1963, p.336, pl.1, fig.10-11. Early Permian. A specimen of the spore *Raistrickia* according to Stover and Evitt, 1978, p.265.

"leptodermum" Maier, 1959, p.321-322, pl.33, fig.5-6. Middle Oligocene-Late Miocene. In his restudy of the holotype of this species, Sarjeant, 1983, p.100 concluded that it is a *jr syn.* of *Achomosphaera alcicornu.*

"lobospinosum" (Gocht *in* Weiler, 1956). NOW *Chiropteridium.*

"longifilum" Maier, 1959, p.317, pl.32, fig.7. Middle Oligocene. Downie and Sarjeant, 1965, p.92 considered this species to be an acritarch and transferred it to the genus *Baltisphaeridium.* O.C.

"longifurcatum" (Firtion, 1952). NOW *?Surculosphaeridium.*

"machaerophorum" (Deflandre and Cookson, 1955). NOW *Lingulodinium.*

"macrotubulum" (Neale and Sarjeant, 1962). See *?Oligosphaeridium macrotubulum.*

"magdalium" (Drugg, 1967). *Jr syn.* of *Tanyosphaeridium xanthiopyxides* according to Stover and Evitt, 1978, p.85. For complete citation see *"Tanyosphaeridium magdalium".*

HYSTRICHOSPHAERIDIUM **(cont'd)**

"magnarmatum" Tasch, 1964, p.192, pl.1, fig.22. Albian. Stover and Evitt, 1978, p.267 considered this species to be a synonym of *"Kiokansium unituberculatum"*.

"majus" (Lejeune-Carpentier, 1940). NOW *Amphorosphaeridium*. See also *?Dapsilidinium, Cordosphaeridium* and *?Polysphaeridium*.

"mantellii" (Davey and Williams, 1966b). NOW *Florentinia*.

"maranhense" (Regali *et al.*, 1974). NOW *?Spiniferites*.

"mariannae" (Philippot, 1949). NOW *Achomosphaera*.

"marsupium" (Tasch, 1964). Stover and Evitt, 1978, p.267 considered this species to be a synonym of *"Kiokansium unituberculatum"*. For complete citation see *"?Polysphaeridium marsupium"*.

"microtriainum" (Klumpp, 1953). NOW *Operculodinium*.

mineralosum Varma and Dangwal, 1964, p.64-65, pl.1, fig.8-12; pl.2, fig.1. Eocene-Oligocene. Stover and Evitt, 1978, p.56 considered this to be a "problematical species".

subsp. *jekhowskyi* Varma and Dangwal, 1964, p.65, pl.1, fig.12; pl.2, fig.1. Eocene-Oligocene.

subsp. *labiatum* Varma and Dangwal, 1964, p.64-65, pl.1, fig.10-11. Eocene-Oligocene.

"monstruosum" (Tasch, 1964). NOW *Coronifera*.

multicornutum Kimyai, 1966, p.471, pl.2, fig.20. Cenomanian. Stover and Evitt, 1978, p.56 considered this species to be a "problematical species".

"multifurcatum" (Deflandre, 1937b). NOW *Cleistosphaeridium*.

"oligacanthum" (W. Wetzel, 1952). NOW *Laticavodinium*.

subsp. *"complanatum"* (W. Wetzel, 1952). NOW *Solisphaeridium stimuliferum* subsp. *complanatum*, an acritarch, according to Sarjeant, 1984c, p.142.

subsp. *"granulatum"* (W. Wetzel, 1952). NOW *?Surculosphaeridium granulatum*.

subsp. *"stella"* (W. Wetzel, 1952). NOW *?Surculosphaeridium phoenix* subsp. *stella*.

subsp. *"velatum"* (W. Wetzel, 1952). NOW *?Cauca velata*.

HYSTRICHOSPHAERIDIUM (cont'd)

pachydermum Cookson and Eisenack, 1960b, p.251-252, pl.38, fig.5; text-fig.5. Oxfordian-Tithonian. Stover and Evitt, 1978, p.56 considered this to be a "problematical species".

palmatum (White, 1842, p.39, pl.4, fig.12 *ex* Bronn, 1848, p.1375) Downie and Sarjeant, 1965, p.121. Although Stover and Evitt, 1978, p.57 stated that their citation "recognizes Sarjeant's first use of *palmatum* in *Hystrichosphaeridium*", they are incorrect. Using a generic and specific name together does not constitute a new combination. The actual recombination was effected by Downie and Sarjeant, 1965, p.121 under *H. recurvatum,* when they cited the correct page, plate and figure number, as well as three choices of names for the species. Originally *Xanthidium;* subsequently *Spiniferites,* then *Cordosphaeridium.*

subsp. *parvum* (Rozen, 1965, p.303-304, pl.4, fig.6; text-fig.13) Lentin and Williams, 1981, p.144. Late Eocene; formerly *Hustrichosphaeridium recurvatum* var. *parvum.* Lentin and Williams, 1973, p.79 raised this variety to the subspecies level.

"palmatum" (Deflandre and Courteville, 1939). NOW *?Exochosphaeridium.* This species was transferred from *Hystrichosphaeridium* to the acritarch genus *Baltisphaeridium* by Downie and Sarjeant, 1965, p.94. *?Exochosphaeridium palmatum* is considered to be a *jr syn.* of *Pervosphaeridium pseudhystrichodinium* (Deflandre, 1937b) Yun, 1981 by Yun, 1981, p.29.

paracostatum Cookson and Eisenack, 1974, p.65-66, pl.25, fig.11-13. Albian-Senonian.

"paradoxum" (Brosius, 1963). NOW *Bipolaribucina.*

"paraense" (Regali *et al.,* 1974). NOW *Tuberculodinium.*

"parvispinum" (Deflandre, 1937b) Cookson and Eisenack, 1958, p.45. NOW *Prolixosphaeridium;* formerly *Hystrichosphaeridium xanthiopyxides* var. *parvispinum.* Cookson and Eisenack, *op.cit.* raised this taxon to the species level.

parvum Davey, 1969b, p.5, pl.1, fig.8; pl.2, fig.1. ?Campanian-Maastrichtian.

"pattei" (Valensi, 1948). NOW *?Lanterna.*

patulum Davey and Williams, 1966b, p.60, pl.10, fig.5. Early Eocene.

paucifurcatum Cookson and Eisenack, 1961b, p.44, pl.2, fig.15. Eocene. Stover and Evitt, 1978, p.56 considered this to be a "problematical species".

"paulinae" (Valensi, 1953). NOW *?Dapsilidinium.*

HYSTRICHOSPHAERIDIUM (cont'd)

"penicillatum" (Ehrenberg, 1843) Deflandre, 1937b, p.27. NOW *Systematophora.* Originally *Xanthidium;* subsequently *Ovum hispidum,* then *Hystrichosphaera.* Stover and Evitt, 1978, p.56 considered this species to be a "problematical species" of *Hystrichosphaeridium.*

"perforatum" (Gocht, 1959). NOW *Oligosphaeridium.*

"perifurcatus" Salujha *et al.,* 1969, p. , pl.4, fig.51-52,55,62. Early Eocene. Jain, 1982, p.53 considered this species to be a *jr syn.* of *Hystrichokolpoma rigaudiae.*

"perovatum" (Tasch, 1964). Stover and Evitt, 1978, p.267 considered this species to be a synonym of *"Kiokansium unituberculatum".* For complete citation see *Polysphaeridium perovatum.*

perplexum Varma and Dangwal, 1964, p.64, pl.1, fig.5-6. Eocene-Oligocene. Stover and Evitt, 1978, p.56 considered this to be a "problematical species".

petilum Gitmez, 1970, p.289-290, pl.9, fig.1,6; text-fig.24. Early Kimmeridgian.

"?phoenix" (Duxbury, 1980). NOW *Surculosphaeridium.* Duxbury, 1980, p.124 questionably included this species in *Hystrichosphaeridium.*

"pilosum" (Ehrenberg, 1854) Deflandre, 1937b, p.31. NOW *Sentusidinium.*

"placacanthum" (Deflandre and Cookson, 1955). NOW *Systematophora.*

"plicatum" (Maier, 1959, p.318, pl.33, fig.1) Downie and Sarjeant, 1965, p.94 considered this species to be an acritarch and transferred it to the genus *Baltisphaeridium.* This transfer was accepted by Lentin and Williams, 1981, p.145, who noted that the illustrated specimen appears to be related to the genera *Achomosphaera* and *Spiniferites.* Sarjeant, 1983, p.93, who re-examined the holotype, considered this species to be a *jr syn.* of *Spiniferites ramosus* subsp. *gracilis.*

"polonicum" (Gorka, 1965). NOW *Compositosphaeridium.*

"polyplasium" (Maier, 1959). NOW *Spiniferites.*

"polytrichum" (Valensi, 1947). NOW *Cleistosphaeridium.*

"protellipticum" Tasch, 1964, p.194, pl.2, fig.2. Albian. Stover and Evitt, 1978, p.267 considered this species to be a synonym of *"Kiokansium unituberculatum".*

"pseudhystrichodinium" (Deflandre, 1937b). NOW *Pervosphaeridium;* also formerly *Baltisphaeridium* and *Exochosphaeridium.*

HYSTRICHOSPHAERIDIUM *"pseudhystrichodinium"* (cont'd)

subsp. *"magnum"* (W. Wetzel, 1955). NOW *Coronifera oceanica* subsp. *magna.*

"pseudorecurvatum" (Morgenroth, 1966a). NOW *Melitasphaeridium.*

"pterophorum" (Deflandre and Courteville, 1939). NOW *Dinopterygium.*

"pulcherrimum" (Deflandre and Cookson, 1955). NOW *Oligosphaeridium.*

"radiculatum" (Davey and Williams, 1966b). NOW *Florentinia.*

"ramuliferum" (Deflandre, 1937b). NOW *Achomosphaera.*

raritanianum Kimyai, 1966, p.471, pl.2, fig.19. Cenomanian. Stover and Evitt, 1978, p.56 considered this to be a "problematical species".

"readei" (Davey and Williams, 1966b). NOW *Kleithriasphaeridium.*

"recurvatum" (White, 1842, p.39, pl.4, fig.12) Davey and Williams, 1966b, p.67-68. Senonian; formerly *Xanthidium. Jr syn.* of *Hystrichosphaeridium palmatum* (White) Downie and Sarjeant according to Stover and Evitt, 1978, p.57.

subsp. *"parvum"* (Rozen, 1965) Lentin and Williams, 1973, p.79. NOW *Hystrichosphaeridium palmatum* subsp. *parvum;* formerly *Hystrichosphaeridium recurvatum* var. *parvum.*

subsp. *"polypes"* (Cookson and Eisenack, 1962b). NOW *Kiokansium polypes.*

"redonense" Morzadec-Kerfourn, 1966, p.139, pl.2, fig.1-2. Holocene. *Jr syn.* of *Lingulodinium machaerophorum* according to Harland, 1977b, p.94.

"rehdense" (Maier, 1959, p.317-318, pl.32, fig.3-4) Downie and Sarjeant, 1965, p.95 considered this species to be an acritarch and transferred it to the genus *Baltisphaeridium.* This transfer was accepted by Lentin and Williams, 1981, p.146, who noted that the illustrated specimens appear to be related to the genus *Achomosphaera.* In his restudy of the holotype of this species, Sarjeant, 1983, p.97-99 concluded that it is a *jr syn.* of *Achomosphaera ramulifera.*

"reniforme" (Tasch, 1964). See *Oligosphaeridium reniforme.*

"replexum" Tasch, 1964, p.193, pl.3, fig.14. Albian. Stover and Evitt, 1978, p.267 considered this species to be a synonym of *"Kiokansium unituberculatum".*

"rhabdophorum" (Valensi, 1955b). NOW *?Dapsilidinium.*

***HYSTRICHOSPHAERIDIUM* (cont'd)**

"rhopalophorum" (Valensi, 1955a). NOW *?Exochosphaeridium.*

robustum Sah *et al.*, 1970, p.146, pl.2, fig.16-17. Late Cretaceous. Based on re-examination of the type specimen, Jain, 1982, p.52 stated that this is an "unidentifiable specimen". Therefore, the name should be restricted to the holotype.

salpingophorum Deflandre, 1935, p.232, pl.9, fig.1; emend. Davey and Williams, 1966b, p.61-62. Senonian; formerly *Hystrichosphaera.*

"salvadorense" (Regali *et al.*, 1974). NOW *Thalassiphora.*

"saturnium" (Maier, 1959, p.319-320, pl.32, fig.8) Downie and Sarjeant, 1965, p.95 considered this species to be an acritarch and transferred it to the genus *Baltisphaeridium.* This transfer was accepted by Lentin and Williams, 1981, p.146, who noted that the illustrated specimen appears to be related to the genus *Wetzeliella.* Sarjeant, 1983, p.107-108 considered this species to be a *jr syn.* of *Wetzeliella symmetrica.*

"scaffoldi" (Baksi, 1962). NOW *Cannosphaeropsis.*

scissospinum Yun, 1981, p.32-33, pl.16, fig.3,7-8,10; text-fig.8. Early Santonian.

scoriaceum Raynaud, 1978, p.393, pl.1, fig.4-5. Berriasian-Middle Valanginian.

"seminudum" (W. Wetzel, 1952, p.405, text-fig.25) Danian. NOW *?Solisphaeridium seminudum,* an acritarch, according to Sarjeant, 1984c, p.143.

senii Srivastava and Banerjee, 1969, p.104, pl.1, fig.12. Eocene. Stover and Evitt, 1978, p.56 considered this to be a "problematical species".

?sergipense (Regali *et al.*, 1974, p.291, pl.24, fig.1) Lentin and Williams, 1981, p.147. Early Eocene; formerly *Hystrichosphaera.* At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Hystrichosphaeridium.*

"sheppeyense" Davey and Williams, 1966b, p.68-69, pl.11, fig.3. Early Eocene. *Jr syn.* of *Melitasphaeridium pseudorecurvatum* according to Stover and Evitt, 1978, p.179.

"simplex" (White, 1842) Deflandre, 1946a, card 934. NOW *Dapsilidinium.*

"simplicispinum" (Davey and Williams, 1966b). NOW *Kleithriasphaeridium.*

"siphoniphorum" (Cookson and Eisenack, 1958). NOW *Litosphaeridium.*

***HYSTRICHOSPHAERIDIUM* (cont'd)**

speciale Lentin and Williams, 1981, p.147 *nom. subst. pro Hystrichosphaeridium irregulare* (Merrill, 1895, p.16; text-fig.4) *non Hystrichosphaeridium irregulare* Pocock, 1962, p.82, pl.15, fig.228-229. Early Cretaceous. See discussion under *"Hystrichosphaeridium irregulare"* (Merrill) Sarjeant.

spini-pansatum (Merrill, 1895, p.17; text-fig.20) Sarjeant, 1964b, p.175. Early Cretaceous; formerly *?Geodia*. Stover and Evitt, 1978, p.56 considered this to be a "problematical species".

"spinosum" (White, 1842). NOW *Exochosphaeridium*.

var. *"deflandrei"* (Lejeune-Carpentier, 1941). NOW *?Fibrocysta deflandrei*.

"spiralisetum" (de Wit, 1943). NOW *Cleistosphaeridium*.

"?stellatum" Maier, 1959, p.320-321, pl.33, fig.3-4. Middle Oligocene-Middle Miocene. Stover and Evitt, 1978, p.56 considered this to be a "provisionally accepted species". In his restudy of the holotype of the species, Sarjeant, 1983, p.104 concluded that *"Hystrichosphaeridium stellatum"* is a *jr syn.* of *Hystrichokolpoma rigaudiae*.

"?stephanophorum" (Benedek, 1972). NOW *Araneosphaera*. Stover and Evitt, 1978, p.56 considered this to be a "provisionally accepted species" of *Hystrichosphaeridium*.

"striatoconus" (Deflandre and Cookson, 1955). NOW *Conosphaeridium*.

"striolatum" (Deflandre, 1937b). NOW *Coronifera*.

sylhetii Baksi, 1962, p.17, fig.26. Eocene. Stover and Evitt, 1978, p.56 considered this to be a "problematical species".

"tiara" (Klumpp, 1953). NOW *Operculodinium*.

"torynum" (Cookson and Eisenack, 1960b). NOW *Egmontodinium*.

"transculentum" (Sah *et al.*, 1970). NOW *Achomosphaera*. Stover and Evitt, 1978, p.56 considered this to be a "problematical species".

"tribrachiosum" (Tasch, 1964). Stover and Evitt, 1978, p.267 considered this species to be a synonym of *"Kiokansium unituberculatum"*. For complete citation see *"?Polysphaeridium tribrachiosum"*.

"tridactylites" (Valensi, 1955a). NOW *Florentinia*.

"triradicosum" Tasch, 1964, p.194, pl.2, fig.4,14. Albian. Stover and Evitt, 1978, p.267 considered this species to be a synonym of *"Kiokansium unituberculatum"*.

***HYSTRICHOSPHAERIDIUM* (cont'd)**

"truncigerum" (Deflandre, 1937b). NOW *Pervosphaeridium;* also formerly *?Litosphaeridium* and *Cordosphaeridium.*

**tubiferum* (Ehrenberg, 1838, pl.1, fig.16) Deflandre, 1937b, p.68; emend. Davey and Williams, 1966b, p.56-58. ?Late Cretaceous. Originally *Xanthidium;* subsequently *Ovum hispidum,* then *Hystrichosphaera.*

subsp. *brevispinum* (Davey and Williams, 1966b, p.58, pl.10, fig.10) Lentin and Williams, 1973, p.80. Early Eocene; formerly *Hystrichosphaeridium tubiferum* var. *brevispinum.* We do not concur with Below, 1982c, p.29 who believed that this subspecies is a *jr syn.* of *?Dapsilidinium fucosum.*

"unituberculatum" (Tasch, 1964). NOW *Kiokansium.*

"valgum" Tasch, 1964, p.192-193, pl.2, fig.10. Albian. Stover and Evitt, 1978, p.267 considered this species to be a synonym of *"Kiokansium unituberculatum".*

"vasiformum" (Neale and Sarjeant, 1962). Duxbury, 1977, p.45 considered this species to be a *jr syn.* of *?Oligosphaeridium asterigerum.* For complete citation see *"Oligosphaeridium vasiformum".*

verbinense Courteville *in* Deflandre, 1946a, card 945. Late Cretaceous. Stover and Evitt, 1978, p.57 considered this species to be a "problematical species".

"vestitum" (Deflandre, 1938b). NOW *Systematophora.* See also *?Surculosphaeridium.*

"whitei" (Deflandre and Courteville, 1939). NOW *?Cometodinium.*

"?xanthiopyxides" (O. Wetzel, 1933b) Deflandre, 1937b, p.29. NOW *Tanyosphaeridium.* Morgenroth, 1968, p.556 questionably included this species in *Hystrichosphaeridium.*

var. *"granulosum"* (Deflandre, 1937b). NOW *Prolixosphaeridium granulosum.*

"xipheum" (Maier, 1959). NOW *?Hystrichokolpoma.*

"zoharyi" (Rossignol, 1962). NOW *Polysphaeridium.*

subsp. *"ktana"* (Rossignol, 1964). NOW *Polysphaeridium subtile* subsp. *ktana.*

HYSTRICHOSPHAERINA Alberti, 1961, p.38. Sarjeant, 1966c, p.209 considered this genus to be a *jr syn.* of *Systematophora* Klement. Previously, Downie and Sarjeant, 1965, p.146 transferred the type of the genus, *Hystrichosphaerina schindewolfii,* and the one other species *"Hystrichosphaerina turonica"*, to *Systematophora.* Stover and Evitt, 1978, p.57-58 retained *Hystrichosphaerina* as a distinct and separate genus.

"anthophora" (Cookson and Eisenack, 1958) Duxbury, 1980, p.126. NOW *Stiphrosphaeridium.* Originally *Hystrichosphaeridium.* This species was retained in *Oligosphaeridium* by Lentin and Williams, 1981, p.200.

"calatha" (Sarjeant, 1961a) Duxbury, 1980, p.126. This species was retained in *Polystephanephorus.* by Lentin and Williams, 1981, p.200.

"?exilimura" (Davey and Williams, 1966b) Sarjeant, 1981, p.122. The provisional transfer of this species to *Hystrichosphaerina* by Sarjeant, *op.cit.* is herein rejected and the species is retained in *Cordosphaeridium.*

orbifera (Klement, 1960, p.66-67, pl.9, fig.9-10; pl.10, fig.7) Stover and Evitt, 1978, p.58. Middle Oxfordian; formerly *Systematophora.*

"paracalatha" (Sarjeant, 1960a) Duxbury, 1980, p.126. This species was retained in *Polystephanephorus.* by Lentin and Williams, 1981, p.232.

"sarjeantii" (Gitmez, 1970) Duxbury, 1980, p.126. This species was retained in *Emmetrocysta.* by Lentin and Williams, 1981, p.95.

**schindewolfii* Alberti, 1961, p.38, pl.10, fig.1-3,6-7. Late Barremian-Turonian. See also *Systematophora schindewolfii.* The contention that *H. schindewolfii* is a *jr syn.* of *Oligosphaeridium anthophorum,* by Davey, 1979c, p.65, was rejected by Lentin and Williams, 1981, p.150. The transfer of this species to *Polystephanephorus* by Yun, 1981, p.36 is herein rejected, since the paratabulation of that genus is imperfectly known.

turonica Alberti, 1961, p.39, pl.10, fig.4a-b. Turonian. See also *Systematophora turonica.*

varians (May, 1980, p.68-69, pl.7, fig.12-16) Lentin and Williams, 1981, p.150. Campanian; formerly *Systematophora.*

HYSTRICHOSPHAEROPSIS Deflandre, 1935, p.232; emend. Sarjeant, 1966b, p.138; emend. Gocht, 1976, p.331-333; emend. Sarjeant, 1982, p.47. Yun, 1981, p.22 considered this genus to be a *jr syn.* of the genus *Triblastula* O. Wetzel.

"borussica" (Eisenack, 1954). NOW *Rottnestia.* See also *Triblastula.*

complanata Eisenack, 1965, p.153, pl.14, fig.5-7; pl.15, fig.5; text-fig.2-3. Late Eocene-Early Oligocene.

HYSTRICHOSPHAEROPSIS **(cont'd)**

"dowiei" (Pocock, 1972) Stover and Evitt, 1978, p.164. Fisher and Riley, 1980, p.320 considered this species to be a *jr syn.* of *Hystrichogonyaulax cladophora* (Deflandre) Stover and Evitt. The contention of Fisher and Riley, *op.cit.* was accepted by Lentin and Williams, 1981, p.115, but was rejected on a later page, p.150, of the same paper. This inconsistency is removed in the present index. Acceptance of the views of Fisher and Riley (1980) negates the transfer of this species to *Hystrichosphaeropsis* by Stover and Evitt, 1978. See also *Gonyaulacysta* and *?Rhynchodiniopsis*.

galeata (Cookson and Eisenack, 1960a, p.3-4, pl.1, fig.16-18) Gocht, 1976, p.332. Albian-Cenomanian. Originally *Scriniodinium,* subsequently *Psaligonyaulax*.

irisae (Kjellström, 1973, p.40-42, fig.34) Gocht, 1976, p.333. Middle-Late Maastrichtian; formerly *?Scriniodinium*.

obscura Habib, 1972, p.379-380, pl.21, fig.1-3. Late Miocene.

**ovum* Deflandre, 1935, p.232, pl.8, fig.11. Senonian. Lentin and Williams, 1973, p.81 rejected the transfer of this species to *"Hystrichosphaera"* by Deflandre, 1937b, p.67.

pontiana (Baltes, 1969, p.35-36, pl.3, fig.15 *ex* Lentin and Williams, 1973, p.123) Stover and Evitt, 1978, p.164. Early Pliocene; formerly *Scriniodinium*.

quasicribrata (O. Wetzel, 1961, p.340, pl.2, fig.3) Gocht, 1976, p.322. Erratic, ?Late Cretaceous; formerly *Triblastula*. See also *Amphidiadema rectangularis, Triblastula nuda* and *Triblastula tubulata*.

rectangularis Bujak *in* Bujak *et al.*, 1980, p.66, pl.16, fig.10-12; text-fig.15. Late Eocene.

HYSTRICHOSTROGYLON Agelopoulos, 1964, p.673; emend. Stover and Evitt, 1978, p.164. Eaton, 1976, p.237 effectively considered this genus a *jr syn.* of *Achomosphaera* Evitt by transferring the type and single species of the genus, *H. membraniphorum,* to *Achomosphaera*. Stover and Evitt, 1978, p.165 rejected this transfer.

holohymenium Islam, 1983a, p.238,240, pl.3, fig.4-6; text-fig.3. Early Eocene.

**membraniphorum* Agelopoulos, 1964, p.674, text-fig.1-2. Late Eocene. See also *Achomosphaera membraniphora*.

I

IMBATODINIUM Vozzhennikova, 1967, p.52-53; emend. Dörhöfer and Davies, 1980, p.36-37. Wiggins, 1975, p.103 considered this genus to be a *jr syn.* of *Pareodinia* Deflandre; emend. Wiggins. He accordingly transferred the type of the genus, *Imbatodinium kondratjevii,* and three other species, *I. antennatum, I. verrucosum,* and *I. villosum,* to *Pareodinia. Imbatodinium villosum* was renamed *Pareodinia dasyforma* Wiggins *non Pareodinia villosa* Tasch. With the designation of *Imbatodinium villosum* as the type of the genus *Gochteodinia* by Norris, 1978, p.7, the name of the species is now *Gochteodinia villosa.* The remaining species, *Imbatodinium imbatodinense,* was transferred to *Pareodinia* by Lentin and Williams, 1977b, p.88. The transfer of *Imbatodinium imbatodinense* to *"Necrobroomea"* by Wiggins, 1975, p.111 was rejected by Lentin and Williams, *op.cit.* Dörhöfer and Davies, 1980, p.36-37 retained *Imbatodinium* and recognized it as a *sr syn.* of both *Batioladinium* and *Necrobroomea.* Lentin and Williams, 1981, p.152 accepted the generic emendation of Dörhöfer and Davies, 1980, p.36-37 and agreed that *Imbatodinium* is a *sr syn.* of both *Batioladinium* and *Necrobroomea.* However, the illustrations of the holotype of *I. kondratjevii* do not support the interpretation of Dörhöfer and Davies, 1980. According to Vozzhennikova, 1967, p.55 (p.104 of translation), the "pylome is oval in outline, located somewhat below the apical protrusion". Pending further examination of the holotype of *I. kondratjevii* we prefer to retain *Imbatodinium* as a monospecific genus. The generic emendation proposed by Mehrotra and Sarjeant, 1984a, p.215 is herein rejected as the emendation appears to exclude the holotype of *I. kondratjevii.* Davey, 1982b, p.20 has arrived at very similar conclusions to us regarding the nature of the archeopyle in *Imbatodinium kondratjevii.*

"antennatum" (Gitmez and Sarjeant, 1972). NOW *Pareodinia.*

"exiguum" (Alberti, 1961) Dörhöfer and Davies, 1980, p.37. NOW and formerly *?Batioladinium.* Originally *Broomea.*

"fractum" (Mehrotra and Sarjeant, 1984a). NOW *Batioladinium.*

"gochtii" (Alberti, 1961) Dörhöfer and Davies, 1980, p.37. NOW and formerly *?Batioladinium.* Originally *Broomea.*

"imbatodinense" (Vozzhennikova, 1967). NOW *Batioladinium.*

"jaegeri" (Alberti, 1961) Dörhöfer and Davies, 1980, p.37. NOW and formerly *Batioladinium.* Originally *Broomea.*

***IMBATODINIUM* (cont'd)**

**kondratjevii* Vozzhennikova, 1967, p.55, pl.9, fig.1-9; pl.10, fig.1-6; pl.11, fig.1-3; pl.15, fig.3-4. Late Jurassic. See also *Pareodinia*.

"longicornutum" (Alberti, 1961) Dörhöfer and Davies, 1980, p.37. NOW and formerly *Batioladinium*. Originally *Broomea*.

"micropodum" (Eisenack and Cookson, 1960) Dörhöfer and Davies, 1980, p.37. NOW and formerly *Batioladinium*. Originally *Broomea*.

"pelliferum" (Alberti, 1961) Dörhöfer and Davies, 1980, p.38. NOW and formerly *?Batioladinium*. Originally *Broomea*.

"pomum" (Davey, 1982) Mehrotra and Sarjeant, 1984a, p.220. NOW and formerly *Batioladinium*.

"radiculatum" (Davey, 1982) Mehrotra and Sarjeant, 1984a, p.153. NOW and formerly *Batioladinium*.

"?tricornoides" (Alberti, 1961) Lentin and Williams, 1981, p.153. NOW and formerly *?Batioladinium*. Originally *Broomea*. At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Imbatodinium*.

"verrucosum" (Vozzhennikova, 1967). NOW *Gochteodinia*.

"villosum" (Vozzhennikova, 1967). NOW *Gochteodinia*. See also *Pareodinia dasyforma*.

IMPAGIDINIUM Stover and Evitt, 1978, p.165.

aculeatum (Wall, 1967, p.104-105, pl.14, fig.18-19; text-fig.3C-D) Lentin and Williams, 1981, p.153. Pleistocene-Holocene; formerly *Leptodinium*. Matsuoka, 1983a, p.7 was incorrect when he attributed the transfer of this species to *Impagidinium* to Matsuoka, 1981.

alectrolophum (Sarjeant, 1966b, p.134-135, pl.15, fig.3-6; text-fig.34) Stover and Evitt, 1978, p.165. Middle Barremian. Originally *Leptodinium*. The transfer of this species to *Pterodinium* by Below, 1982d, p.352-353 is herein rejected.

aquaeductum (Piasecki, 1980) *comb. nov.*
1980 *Nematosphaeropsis aquaeducta* Piasecki, p.70, pl.1, fig.1-3; pl.5, fig.1-2. Middle Miocene.

aspinatum (Cookson and Eisenack, 1974, p.63, pl.23, fig.6) Damassa, 1979a, p.826. Paleocene. Originally *Spiniferites cornutus* var. *aspinatus*; subsequently *Spiniferites cornutus* subsp. *aspinatus*.

***IMPAGIDINIUM* (cont'd)**

californiense Damassa, 1979a, p.829-830, pl.5, fig.1-13; text-fig.8. Early-Middle Eocene.

"churchillii" (Harland, 1968) Matsuoka, 1983a, p.7. See *"Leptodinium churchillii"*.

cristatum (May, 1980, p.57, pl.5, fig.16-20) Lentin and Williams, 1981, p.153. Campanian-Maastrichtian; formerly *Leptodinium*.

**dispertitum* (Cookson and Eisenack, 1965a, p.122-123, pl.12, fig.5-7) Stover and Evitt, 1978, p.165. Late Eocene; formerly *Leptodinium*.

elegans (Cookson and Eisenack, 1965a, p.123-124, pl.12, fig.10-13) Stover and Evitt, 1978, p.165. Late Eocene; formerly *Leptodinium*.

japonicum Matsuoka, 1983b, p.120-121, pl.6, fig.3-5; text-fig.13. Pliocene or younger.

maculatum (Cookson and Eisenack, 1961b, p.40, pl.2, fig.5-6) Stover and Evitt, 1978, p.166. Eocene; formerly *Leptodinium*.

margaritiferum (Cookson and Eisenack, 1960a, p.5, pl.2, fig.1-2; text-fig.1) Stover and Evitt, 1978, p.166. Campanian. Originally *Gonyaulax*; subsequently *Leptodinium*.

"?membranigerum" (Gerlach, 1961) Stover and Evitt, 1978, p.166. NOW and formerly *Leptodinium*. Stover and Evitt, 1978, p.166 considered this to be a "provisionally accepted species" of *Impagidinium*.

multiplexum (Wall and Dale, 1968, p.318, pl.1, fig.1-7) Lentin and Williams, 1981, p.154. Early Pleistocene; formerly *Leptodinium*. Matsuoka, 1983a, p.7 was incorrect when he attributed the transfer of this species to *Impagidinium* to Matsuoka, 1981.

?ovum (Sah *et al.*, 1970, p.147-148, pl.2, fig.25) Stover and Evitt, 1978, p.166. Late Cretaceous; formerly *Leptodinium*. Stover and Evitt, 1978, p.166 considered this to be a "provisionally accepted species".

pacificum Bujak, 1984, p.187, pl.2, fig.3-8. Early-Late Pliocene.

pallidum Bujak, 1984, p.187, pl.2, fig.9-12. Late Eocene-Early Pleistocene.

paradoxum (Wall, 1967, p.106-107, pl.15, fig.5-8; text-fig.2-3A,B) Stover and Evitt, 1978, p.166. Middle Miocene-Recent; formerly *Leptodinium*. Matsuoka, 1983a, p.7 was incorrect when he attributed the transfer of this species to *Impagidinium* to Matsuoka, 1981.

***IMPAGIDINIUM* (cont'd)**

patulum (Wall, 1967, p.105-106, pl.14, fig.20; pl.15, fig.1-4; text-fig.4) Stover and Evitt, 1978, p.166. Middle Miocene-Holocene; formerly *Leptodinium*. Matsuoka, 1983a, p.8 was incorrect when he attributed the transfer of this species to *Impagidinium* to Matsuoka, 1981.

pentahedrias Damassa, 1979b, p.202. 204, pl.3, fig.22,24-26,28-29; pl.4, fig. 1-3,6; text-fig.4. Early Paleocene.

?simplicium (Cookson and Eisenack, 1961b, p.42, pl.2, fig.3-4; text-fig.1e-f) Stover and Evitt, 1978, p.166. Eocene. Originally *Rottnestia;* subsequently *Psaligonyaulax*. Stover and Evitt, 1978, p.166 considered this to be a "provisionally accepted species".

sphaericum (Wall, 1967, p.108, pl.15, fig.11-15; text-fig.2a-c) Lentin and Williams, 1981, p.154. Pleistocene-Holocene; formerly *Leptodinium*. Matsuoka, 1983a, p.8 was incorrect when he attributed the transfer of this species to *Impagidinium* to Matsuoka, 1981.

strialatum (Wall, 1967, p.107-108, pl.15, fig.9-10; text-fig.5) Stover and Evitt, 1978, p.166. Middle Miocene-Holocene; formerly *Leptodinium*. Matsuoka, 1983a, p.8 was incorrect when he attributed the transfer of this species to *Impagidinium* to Matsuoka, 1981.

"striatum" (Clarke and Verdier, 1967) Stover and Evitt, 1978, p.166. NOW *Pterodinium*. Originally *Gonyaulacysta;* subsequently *Leptodinium*.

velorum Bujak, 1984, p.187-188, pl.2, fig.13-16. Middle to Late Eocene-Late Pliocene.

verrucosum (Brideaux and McIntyre, 1975, p.30, pl.9, fig.1-8) Stover and Evitt, 1978, p.166. Middle Albian; formerly *Pterodinium*.

victorianum (Cookson and Eisenack, 1965a, p.123, pl.12, fig.8-9) Stover and Evitt, 1978, p.166. Late Eocene; formerly *Leptodinium*.

"?whitei" (Sarjeant, 1966b) Stover and Evitt, 1978, p.166. NOW *Rhynchodiniopsis;* formerly *Gonyaulacysta*. Stover and Evitt, 1978, p.166 considered this to be a "provisionally accepted species" of *Impagidinium*.

IMPLETOSPHAERIDIUM Morgenroth, 1966a, p.32. See also *Cilioephaeridium* which is a *jr syn.* of this genus.

capillaceum Morgenroth, 1966a, p.33, pl.9, fig.12. Early Eocene.

charrieri Troncoso and Doubinger, 1980, p.102, pl.2, fig.7-8. Maastrichtian-Danian.

IMPLETOSPHAERIDIUM **(cont'd)**

cingulatum (Grigorovich, 1971, p.94, pl.2, fig.1) Stover and Evitt, 1978, p.232-233. Paleocene; formerly *Ciliosphaeridium*. O.C.

cracens Eaton, 1976, p.306, pl.21, fig.6; text-fig.25E. Early-Late Eocene.

?densicomatum (Maier, 1959, p.307, pl.29, fig.7-8) Morgenroth, 1966a, p.33. Middle Oligocene-Middle Miocene. Originally *Galea;* subsequently *Baltisphaeridium*. This species was questionably included in *Impletosphaeridium* by Lentin and Williams, 1973, p.82. Sarjeant, 1983, p.111-113 emended this species based on re-examination of the holotype. His suggestion that *?I. densicomatum* should be transferred to *Sentusidinium* is herein rejected.

"erinaceum" (Morgenroth, 1966a). NOW *Operculodinium*.

granulosum Jain and Tandon, 1981, p.11, pl.2, fig.30-31; pl.3, fig.50. Middle Eocene.

implicatum Morgenroth, 1966a, p.34, pl.9, fig.1-3. Early Eocene. See also *Adnatosphaeridium capilatum* which is a *jr syn.* of this species.

"insolitum" (Eaton, 1976). NOW *?Cleistosphaeridium*.

kroemmelbeinii Morgenroth, 1966a, p.34-35, pl.9, fig.4-5. Early Eocene. Orthographic correction used by Eaton, 1976, p.308.

labyrinthus Morgenroth, 1966a, p.35, pl.9, fig.6-7. Early Eocene.

ligospinosum (De Coninck, 1969, p.50, pl.15, fig.9-19) Islam, 1983a, p.240. Early Eocene; formerly *Baltisphaeridium*.

luxurium Eaton, 1976, p.309, pl.21, fig.3-4; text-fig.25F. Middle-Late Eocene.

multispinosum Benedek, 1972, p.31-32, pl.11, fig.11; pl.12, fig.15. Middle Oligocene.

oblongatum Islam, 1983a, p.240, pl.3, fig.8-9. Early Eocene.

"panniforme" (Gerlach, 1961) Morgenroth, 1966a, p.35. NOW *Cleistosphaeridium;* formerly *Baltisphaeridium*.

petalum Islam, 1983c, p.88, pl.4, fig.1-3,7. Middle Eocene.

"placacanthum" (Deflandre and Cookson, 1955) Morgenroth, 1966a, p.35. NOW *Systematophora*. Originally *Hystrichosphaeridium*.

"polypes" (Cookson and Eisenack, 1962b) He Cheng-quan and Li Peng, 1981, p.65. We herein reject this transfer and retain the species in *Kiokansium* Stover and Evitt.

***IMPLETOSPHAERIDIUM* "*polypes*" (cont'd)**

subsp. *"clavulum"* (Davey, 1969a) He Cheng-quan and Li Peng, 1981, p.65. We herein reject this transfer and retain the taxon as a species of *Cleistosphaeridium.*

subsp. *"densum"* (He Cheng-quan and Li Peng, 1981). NOW *?Kiokansium polypes* subsp. *densum.*

"pycnospinosum" (Benedek, 1972). NOW *?Lingulodinium.*

rugosum Morgenroth, 1966a, p.36, pl.10, fig.2-3. Early Eocene.

"severinii" (Cookson and Cranwell, 1967) Liengjarern *et al.*, 1980, p.486. NOW *Operculodinium;* formerly *Baltisphaeridium.*

**transfodum* Morgenroth, 1966a, p.32, pl.10, fig.45. Early Eocene.

"whitei" (Deflandre and Courteville, 1939) Morgenroth, 1966a, p.37. NOW *?Cometodinium.* Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium.*

"*INVERSIDINIUM*" McLean, 1973b, p.730. *Jr syn.* of *Palaeotetradinium* according to Stover and Evitt, 1978, p.70-71.

"caudatum" (Benson, 1976). NOW *Palaeotetradinium.*

*"*exilimurum"* McLean, 1973b, p.730,732, pl.90, fig.1-9. Late Paleocene. *Jr syn.* of *Palaeotetradinium minusculum* (Alberti) Stover and Evitt according to Stover and Evitt, 1978, p.71.

"minusculum" (Alberti, 1961) Costa and Downie, 1979, p.44. The transfer of this species to *Inversidinium* by Costa and Downie, *op.cit.* was rejected by Lentin and Williams, 1981, p.243, who retained the species in *Palaeotetradinium.*

INVERTOCYSTA Edwards, 1984, p.585.

lacrymosa Edwards, 1984, p.586, pl.3, fig.4a-b,5. Middle-Late Miocene.

**tabulata* Edwards, 1984, p.585-586, pl.3, fig.3a-b; text-fig.6. Middle-Late Miocene.

"*ISABELIA*" Lentin and Williams, 1976, p.56 *non Isabelia* Barbosa-Rodrigues (an orchid). SEE *Isabelidinium.*

ISABELIDINIUM Lentin and Williams, 1977a, p.167. *(nom. subst. pro Isabelia* Lentin and Williams, 1976, p. 56).

***ISABELIDINIUM* (cont'd)**

acuminatum (Cookson and Eisenack, 1958, p.27, pl.4, fig.5-8) Stover and Evitt, 1978, p.109. Cenomanian-Early Turonian. Originally *Deflandrea;* subsequently *Alterbia.*

?amphiatum (McIntyre, 1975, p.65-66, pl.2, fig.5-8) Lentin and Williams, 1977a, p.167. Campanian-Maastrichtian. Originally *Deflandrea;* subsequently *Isabelia.* At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Isabelidinium.* The transfer of this species to *Alterbia* by Yun, 1981, p.64 is herein rejected and the species is retained in *?Isabelidinium.*

bakeri (Deflandre and Cookson, 1955, p.251, pl.4, fig.1-2,4) Lentin and Williams, 1977a, p.167. Paleocene-Early Eocene. Originally *Deflandrea;* subsequently *Isabelia.* The transfer of this species to *Alterbia* by Yun, 1981, p.65 is herein rejected and the species is retained in *Isabelidinium.*

forma *"pellucida"* (Deflandre and Cookson, 1955 as *Deflandrea bakeri.)* See *Isabelidinium pellucidum.*

balmei (Cookson and Eisenack, 1962b, p.486 *nom. subst. pro Deflandrea minor* Cookson and Eisenack, 1960a, p.2, pl.1, fig.1-3) Stover and Evitt, 1978, p.109. The diagnosis was emended by Morgan, 1977, p.130. Turonian-Middle Senonian. Originally *Deflandrea;* subsequently *Alterbia.*

belfastense (Cookson and Eisenack, 1961a, p.71, pl.11, fig.4-6) Lentin and Williams, 1977a, p.167. Senonian; formerly *Deflandrea.*

"conoratum" (Stover, 1974) Lentin and Williams, 1977a, p.167. NOW *Manumiella;* formerly *Deflandrea.* See also *Eurydinium.* O.C.

cooksoniae (Alberti, 1959b, p.97, pl.9, fig.1-6) Lentin and Williams, 1977a, p.167. Late Senonian. Originally *Deflandrea;* subsequently *Australiella,* then *Isabelia.*

"cretaceum" (Cookson, 1956) Lentin and Williams, 1977a, p.167. NOW *?Manumiella;* formerly *Deflandrea.*

"dakotaense" (Stanley, 1965) Lentin and Williams, 1977a, p.167. NOW *?Chatangiella;* formerly *Deflandrea.*

"delicatum" (Baltes, 1969, *ex* Lentin and Williams, 1973) Lentin and Williams, 1977a, p.167. NOW *Manumiella;* formerly *Deflandrea.*

"druggii" (Stover, 1974) Lentin and Williams, 1977a, p.167. NOW *Manumiella;* formerly *Deflandrea.* O.C.

ISABELIDINIUM **(cont'd)**

?extremum (Cookson and Eisenack, 1974, p.48, pl.20, fig.4) Stover and Evitt, 1978, p.109. Albian-Cenomanian. Originally *Deflandrea;* subsequently *?Spongodinium*. Stover and Evitt, 1978, p.109 considered this to be a "provisionally accepted species".

gallium (Davey and Verdier, 1973, p.196-197, pl.3, fig.1-4) Stover and Evitt, 1978, p.109. Late Albian. Originally *Deflandrea;* subsequently *Spinidinium*.

"gambangense" (Cookson and Eisenack, 1970a) Lentin and Williams, 1977a, p.167. NOW *Eucladinium;* formerly *Deflandrea*.

glabrum (Cookson and Eisenack, 1969, p.3, fig.1a) Lentin and Williams, 1977a, p.167. Albian-Cenomanian. Originally *Deflandrea;* subsequently *Isabelia*.

?globosum (Davey, 1970, p.344, pl.2, fig.3) Lentin and Williams, 1977a, p.167. Cenomanian. Originally *Deflandrea;* subsequently *Isabelia*. This species was tentatively included in *Isabelidinium* by Lentin and Williams, 1981, p.157 who considered it may represent an endocyst.

"glomeratum" (Davey, 1970) Lentin and Williams, 1977a, p.167. NOW *Eurydinium;* formerly *Deflandrea*.

?haumuriense Wilson, 1984c, p.554, fig.14-21. ?Santonian-Maastrichtian. We provisionally include this species in *Isabelidinium*, because the 2a is standard hexa.

**korojonense* (Cookson and Eisenack, 1958, p.27-28, pl.4, fig.10-11) Lentin and Williams, 1977a, p.167. Campanian-Early Maastrichtian. Originally *Deflandrea;* subsequently *Isabelia*.

"latum" (Cookson and Eisenack, 1968) Lentin and Williams, 1977a, p.168. NOW *Manumiella;* formerly *Deflandrea*.

"madurense" (Cookson and Eisenack, 1970a) Lentin and Williams, 1977a, p.168. NOW *Eucladinium;* formerly *Deflandrea*.

magnum (Davey, 1970, p.342-343, pl.2, fig.6-8) Stover and Evitt, 1978, p.109. Cenomanian. Originally *Deflandrea;* subsequently *Chatangiella*.

microarmum (McIntyre, 1975, p.65, pl.1, fig.5-8) Lentin and Williams, 1977a, p.168. Campanian-Maastrichtian. Originally *Deflandrea;* subsequently *Isabelia*.

***ISABELIDINIUM* (cont'd)**

?microverrucosum (Yu Jingxian and Zhang Wangping, 1980) *comb. nov.* 1980 *Deflandrea microverrucosa* Yu Jingxian and Zhang Wangping, p.109, pl.3, fig.1-2. Campanian-Early Maastrichtian. This species is questionably included in *Isabelidinium* because of the difficulty in interpreting the morphology of the holotype.

pellucidum (Deflandre and Cookson, 1955, p.251, pl.4, fig.3) Lentin and Williams, 1977a, p.168. Paleocene-Early Eocene; formerly *Deflandrea bakeri* forma *pellucida*. This forma was raised to the species level by Cookson and Eisenack, 1958, p.27. The transfer of this species to *Alterbia* by Yun, 1981, p.64 is herein rejected and the species is retained in *Isabelidinium*.

psilatum (Yu Jingxian and Zhang Wangping, 1980) *comb. nov.* 1980 *Deflandrea psilata* Yu Jingxian and Zhang Wangping, p.108-109, pl.2, fig.19-20. Campanian-Early Maastrichtian.

?rhombovale (Cookson and Eisenack, 1970a, p.143, pl.12, fig.10-11) Lentin and Williams, 1977a, p.168. Late Albian-Senonian. Originally *Deflandrea;* subsequently *Isabelia*. Stover and Evitt, 1978, p.109 considered this to be a "provisionally accepted species".

"seelandicum" (Lange, 1969) Lentin and Williams, 1977a, p.168. NOW *Manumiella;* formerly *Broomea*.

spasicum (Grigorovich, 1969b, p.67-68, pl.1, fig.1) Lentin and Williams, 1981, p.158. Late Cretaceous; formerly *Australiella*.

"spinosissimum" (Cookson and Eisenack, 1970a) Lentin and Williams, 1977a, p.168. NOW *Eucladinium;* formerly *Deflandrea*.

thomasii (Cookson and Eisenack, 1961a, p.71-72, pl.11, fig.7-10) Lentin and Williams, 1977a, p.168. Senonian. Originally *Deflandrea;* subsequently *Isabelia*. O.C.

"tingitanense" Rauscher and Doubinger, 1982, p.103-104, pl.1, fig.1-6; pl.2, fig. 17. Late Maastrichtian. This species is herein considered to be a *jr syn.* of *Manumiella druggii*.

ISTHMOCYSTIS Duxbury, 1979a, p.199-200.

**distincta* Duxbury, 1979a, p.201, pl.1, fig.1-6; pl.2, fig.8; text-fig.3-4. Valanginian.

J

JANSONIA Pocock, 1972, p.97.

**jurassica* Pocock, 1972, p.97-98, pl.29, fig.8-9; text-fig.14-15. Late Bajocian.

JUSELLA Vozzhennikova, 1963, p.183. This is a siliceous dinoflagellate.

crebraporosa Vozzhennikova, 1967, p.120, pl.53, fig.1-6. Early Oligocene.

**denticulata* Vozzhennikova, 1963, p.183; text-fig.19a-b. Early Oligocene. Holotype lost. Lectotype chosen by Vozzhennikova, 1967, p.119-120, pl.52, fig.1-5.

"*rariporosa*" Vozzhennikova, 1967, p.119-120. Invalid. Name chosen by Vozzhennikova to replace the name *J. denticulata* as her interpretation of the morphology of *J. denticulata* was incorrect in 1963. However, under the I.C.B.N., Art. 62, the original specific name cannot be changed in this way.

K

KAIWARADINIUM Wilson, 1978, p.81-82.

**buccinatum* Wilson, 1978, p.82, fig.2-8. Early Tithonian.

ramosum Wilson, 1984a, p.217,219,221, fig.12-21. Early Tithonian.

KALLOSPHAERIDIUM De Coninck, 1969, p.44.

?agglutinatum McIntyre and Brideaux, 1980, p.25, pl.12, fig.5-12. Valanginian. McIntyre and Brideaux, *op.cit.* questionably included this species in *Kallosphaeridium*.

?bellulum (Jiabo, 1978, p.51, pl.23, fig.14-16) Lentin and Williams, 1981, p.160. Early Tertiary; formerly *Tenua*. At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Kallosphaeridium*.

biornatum Stover, 1977, p.73-74, pl.1, fig.9-10. Early Oligocene.

"biornatum" (Jiabo, 1978) Lentin and Williams, 1981. *Jr hom.* of *Kallosphaeridium biornatum* Stover, 1977. NOW *Kallosphaeridium biparatum* Lentin and Williams; formerly *Tenua biornata*.

subsp. *"biornatum"*. *Jr hom.* NOW *Kallosphaeridium biparatum* subsp. *biparatum;* formerly *Tenua biornata* subsp. *biornata*.

subsp. *"crassum"* (Jiabo, 1978). NOW *Kallosphaeridium biparatum* subsp. *crassum;* formerly *Tenua biornata* subsp. *crassum*.

biparatum Lentin and Williams, 1981, p.160, *nom. subst. pro Kallosphaeridium biornatum* Jiabo, 1978, p.52, pl.22, fig.21-29; pl.23, fig.1-4 *non K. biornatum* Stover, 1977. Early Tertiary; formerly *Tenua biornata*. When Lentin and Williams, 1981 effected the transfer, *Kallosphaeridium biornatum* (Jiabo) Lentin and Williams became a *jr syn.* of *K. biornatum* Stover. Lentin and Williams, *op.cit.* therefore proposed the name *Kallosphaeridium biparatum*.

subsp. *biparatum* Lentin and Williams, 1981, p.160 *nom. subst. pro Kallosphaeridium biornatum* subsp. *biornatum* Jiabo, 1978, p.52, pl.22, fig.21-29 *non K. biornatum* subsp. *biornatum* Stover. Early Tertiary; formerly *Tenua biornata* subsp. *biornata*.

***KALLOSPHAERIDIUM biparatum* (cont'd)**

subsp. *crassum* (Jiabo, 1978, p.52, pl.23, fig.1-4) Lentin and Williams, 1981, p.160. Early Tertiary; formerly *Tenua biornata* subsp. *crassa*. Lentin and Williams, 1981, p.160 incorrectly noted this species as a *nom. nov.*

**brevibarbatum* De Coninck, 1969, p.44-45, pl.13, fig.14-15. Early Eocene.

capulatum Stover, 1977, p.74, pl.1, fig.11-13. Middle-Late Oligocene.

coninckii (Burger, 1980a, p.74, pl.26, fig.5-6) Burger, 1980b, p.277. Albian; formerly *Membranosphaera*.

curiosum Bujak, 1984, p.188, pl.2, fig.17-20. Middle-Late Eocene.

?granulatum (Norvick *in* Norvick and Burger, 1976, p.79-80, pl.11, fig.9; pl.12, fig.3) Stover and Evitt, 1978, p.59. Cenomanian; formerly *Membranosphaera*. At the time of the transfer, Stover and Evitt, *op.cit.* considered this to be a "provisionally accepted species".

?minor (Jiabo, 1978, p.52-53, pl.23, fig.5-7) Lentin and Williams, 1981, p.161. Early Tertiary; formerly *Tenua hystrix* subsp. *minor*. At the time of the transfer, Lentin and Williams, *op.cit.* raised this taxon to the species level and questionably included it in *Kallosphaeridium*.

norvickii (Burger, 1980a, p.73-74, pl.26, fig.7-8) Lentin and Williams, 1981, p.161. Albian; formerly *Membranosphaera*.

orchiesense De Coninck, 1975, p.101-102, pl.18, fig.15-17. Early Eocene (Ypresian).

romaense (Burger, 1980a, p.74, pl.27, fig.1-3) Burger, 1980b, p.277. Aptian; formerly *Membranosphaera*.

KALYPTEA Cookson and Eisenack, 1960b, p.256; emend. Wiggins, 1975, p.110. Gocht, 1970b, p.154 considered this genus to be a *jr syn.* of *Pareodinia*. Dörhöfer and Davies, 1980, p.30 considered *Kalyptea* and *Komewuia* to be synonymous. They preferred to retain *Komewuia* and suppress *Kalpytea*, since they believed that the original description of *Komewuia* better circumscribed pareodiniacean forms with an antapical horn than that of *Kalyptea*. Lentin and Williams, 1981, p.161 stated, "Since *Kalpytea* and *Komewuia* were erected in the same publication (Cookson and Eisenack, 1960b), the author who first designated the two genera as being synonymous (Wiggins, 1975) had the right of name choice and must be followed (I.C.B.N. Art. 57). Therefore, the generic epithet *Kalyptea* must be retained and *Komewuia* suppressed (E.H. Davies, pers. comm.)." Chen, 1982, p.32 emended *Komewuia* to include only forms with a precingular archeopyle resulting from the loss of a single paraplate. Re-evaluation of the holotype of *K. glabra*, the type of *Komewuia*, confirms this interpretation. Accordingly, *Komewuia* and *Kalyptea* are herein regarded as two distinct and separate genera.

KALYPTEA (cont'd)

"aceras" (Manum and Cookson, 1964). NOW *Caligodinium.*

"amiculum" (Drugg, 1970b) Jain and Millepied, 1975, p.145. This transfer was rejected by Lentin and Williams, 1977b, p.17, who retained the species in *Caligodinium.*

**diceras* Cookson and Eisenack, 1960b, p.256-257, pl.39, fig.1; emend. Fisher and Riley, 1980, p.323. Tithonian. Gocht, 1970b, p.154 considered this species to be a questionable *jr syn.* of *Pareodinia ceratophora* Deflandre. However Wiggins, 1975, p.110 presented an emended diagnosis for *Kalyptea* and retained *K. diceras* as the type of the genus. The transfer of this species to *Komewuia* by Dörhöfer and Davies, 1980, p.30 was rejected by Lentin and Williams, 1981, p.161.

distincta Jain and Millepied, 1975, p.145-146, pl.4, fig.65. Aptian-Albian. Stover and Evitt, 1978, p.110 considered this to be a "problematical species".

"glabra" (Cookson and Eisenack, 1960b) Wiggins, 1975, p.110. NOW and formerly *Komewuia.* The retention of this species in *Komewuia* by Dörhöfer and Davies, 1980, p.31 was rejected by Lentin and Williams, 1981, p.162.

"granulata" (Jiabo, 1978). NOW *Caligodinium.*

"halosa" (Filatoff, 1975). This species was transferred to the genus *Caddasphaera* Fenton *et al.*, 1980 by Fenton *et al.*, *op.cit.*, p.164. Stover and Evitt, 1978, p.110 considered this to be a "problematical species" of *Kalyptea.*

?indica Jain and Maheshwari, 1982 *in* Jain, Kumar and Maheshwari, 1982, p.24-25, pl.1, fig.7-12; text-fig.1A-C. ?Late Jurassic. This form is herein questionably included in *Kalyptea,* although it exhibits a type 2I to 3I archeopyle.

"jurassica" Alberti, 1961, p.21, pl.7, fig.8. Wiggins, 1975, p.110 considered this species to be a *jr syn.* of *Kalyptea stegasta* (Sarjeant) Wiggins. Prior to this, Gocht, 1970b, p.154 considered *Kalyptea jurassica* to be a questionable *jr syn.* of *Pareodinia ceratophora* Deflandre.

"monoceras" Cookson and Eisenack, 1960b, p.275, pl.39, fig.2-3. Gocht, 1970b, p.154 considered this species to be a questionable *jr syn.* of *Pareodinia ceratophora* Deflandre. Wiggins, 1975, p.103 also considered *"Kalyptea monoceras"* to be a *jr syn.* of *Pareodinia ceratophora.*

"stegasta" (Sarjeant, 1961a) Wiggins, 1975, p.110. NOW and formerly *Netrelytron.* See Sarjeant, 1976c, p.16.

"trinetron" (Sarjeant, 1966c) Wiggins, 1975, p.110. NOW and formerly *Netrelytron.* See Sarjeant, 1976c, p.16-17.

KENLEYIA Cookson and Eisenack, 1965b, p.135-136.

?essentialis (De Coninck, 1969, p.38, pl.11, fig.7-8) Stover and Evitt, 1978, p.167. Early Eocene; formerly *Lanternosphaeridium*. Stover and Evitt, 1978, p.167 considered this to be a "provisionally accepted species".

"fimbriata" (Cookson and Eisenack, 1967b). NOW *Muratodinium*.

leptocerata Cookson and Eisenack, 1965b, p.136, pl.17, fig.5-6. Paleocene.

lophophora Cookson and Eisenack, 1965b, p.136-137, pl.17, fig.7-10. Paleocene.

?nuda De Coninck, 1969, p.45-46, pl.13, fig.24-25. Early Eocene. De Coninck, *op.cit.* questionably included this species in *Kenleyia*. Stover and Evitt, 1978, p.167 considered this to be a "provisionally accepted species".

**pachycerata* Cookson and Eisenack, 1965b, p.136, pl.17, fig.1-3. Paleocene.

KIOKANSIUM Stover and Evitt, 1978, p.167; emend. Duxbury, 1983, p.48. Below, 1982c, p.13-17 considered the genera *Bacchidinium* Davey, 1979 and *Taleisphaera* Duxbury, 1979 to be *jr synonyms* of *Kiokansium*. We agree with Below, *op.cit.* that the type of the genus *Bacchidinium, B. polypes,* should be included in *Kiokansium*. However, we do not agree that *Taleisphaera* is a *jr syn.* of *Kiokansium,* since the type of that genus, *T. hydra,* has penitabular arrangement of processes and the generic diagnosis of *Kiokansium* specifically states that it has no parasutural features and the processes are nontabular.

?erectum (Manum and Cookson, 1964, p.14, pl.3, fig.5-6) Below, 1982c, p.15. Cretaceous. Originally *Hystrichosphaeridium;* subsequently *?Cordosphaeridium,* then *?Cleistosphaeridium.*

"hydra" (Duxbury, 1979a) Below, 1982c, p.16. We herein reject the transfer of this species to *Kiokansium* and retain it in *Taleisphaera.*

perprolatum Ch. Singh, 1983, p.150-151, pl.54, fig.7-8. Middle Cenomanian.

**polypes* (Cookson and Eisenack, 1962b, p.491, pl.4, fig.11-13) Below, 1982c, p.16. Albian-Cenomanian. Originally *Hystrichosphaeridium recurvatum* subsp. *polypes;* subsequently *Cleistosphaeridium polypes,* then *Bacchidinium polypes.* See also *Impletosphaeridium.* See also *Kiokansium unituberculatum,* the original type species of *Kiokansium,* and considered to be a *jr syn.* of *Kiokansium polypes* by Duxbury, 1983, p.49.

subsp. *"clavulum"* (Davey, 1969a). See *Cleistosphaeridium clavulum.*

***KIOKANSIUM polypes* (cont'd)**

subsp. *densum* (He Cheng-quan and Li Peng, 1981) *comb. nov.* 1981 *Impletosphaeridium polypes* subsp. *densum* He Cheng-quan and Li Peng, p.65, pl.31, fig.14-17; text-fig.6. Late Oligocene.

prolatum Duxbury, 1983, p.49-50, pl.6, fig.4,8. Late Aptian-Early Albian.

"sarmentum" (Davey, 1979b) Davey, 1982a, p.377. NOW *Kleithriasphaeridium;* formerly *Bacchidinium*.

"unituberculatum" (Tasch, 1964, p.194, pl.3, fig.8) Stover and Evitt, 1978, p.167. Albian; formerly *Hystrichosphaeridium*. This species, the original type of the genus, was considered to be a *jr syn.* of *Kiokansium polypes* (Cookson and Eisenack, 1962b) Below, 1982c, by Duxbury, 1983, p.49. *Kiokansium polypes* therefore becomes the correct name for the nomenclatural type of the genus.

williamsii Ch. Singh, 1983, p.150-151, pl.54, fig.3-6. Albian-Cenomanian.

"KISSELEVIA" Vozzhennikova, 1967, p.103. Presumably an orthographic misrepresentation of *Kisselovia* Vozzhennikova. Lentin and Williams, 1973, p.83 were in error when they stated that *Kisselovia* Vozzhennikova, 1963 was a *nomen nudum*. They based their statement on the fact that a holotype was not designated for the type of the genus, *Kisselovia ornata*. *Kisselovia* was and remains the correct orthography for the valid name under I.C.B.N., Art. 37.

KISSELOVIA Vozzhennikova, 1963, p.183; emend. Lentin and Williams, 1976, p.134-137. Lentin and Williams, 1973 p.83 were in error when they stated that *Kisselovia* was a *nomen nudum* because a holotype was not designated for the type of the genus, *K. ornata*. As Stafleu (personal communication) has pointed out, a type cannot be validly published, only a name can (I.C.B.N., Art. 37). *Kisselovia* is therefore valid.

?clathrata (Eisenack, 1938, p.187; text-fig.5) Lentin and Williams, 1976, p.136. Late Eocene-Early Oligocene; formerly *Wetzeliella*. Lentin and Williams, *op.cit.* questionably included this species in *Kisselovia*.

subsp. *angulosa* Châteauneuf and Gruas-Cavagnetto, 1978, p.69-70, pl.5, fig.8-9. Early Oligocene (Sannoisian).

subsp. *"fasciata"* (Rozen, 1965) Lentin and Williams, 1976, p.136. NOW *Kisselovia fasciata;* formerly *Wetzeliella clathrata* var. *fasciata*. This taxon was raised to subspecies status by Lentin and Williams, 1973, p.14.

coleothrypta (Williams and Downie, 1966b, p.185-186, pl.18, fig.8-9; text-fig. 47) Lentin and Williams, 1976, p.136. Early Eocene; formerly *Wetzeliella*.

subsp. *rotundata* Châteauneuf and Gruas-Cavagnetto, 1978, p.68-69, pl.3, fig.5. Middle-Late Eocene (Lutetian-Bartonian).

***KISSELOVIA* (cont'd)**

crassiramosa (Williams and Downie, 1966b, p.189-190, pl.19, fig.1,5,7; text-fig. 50) Damassa, 1979a, p.837. Early Eocene. Originally *Wetzeliella tenuivirgula* var. *crassiramosa;* subsequently *Wetzeliella tenuivirgula* subsp. *crassiramosa,* then *Kisselovia tenuivirgula* subsp. *crassiramosa.* The taxon was raised to subspecies status by Lentin and Williams, 1973, p.143. O.C. The elevation of this taxon to species status is not attributable to Costa and Downie, 1979, p.44.

edwardsii (Wilson, 1967c, p.477, fig.8-9) Stover and Evitt, 1978, p.111. Early Eocene; formerly *Wetzeliella.* O.C. The transfer of this species from *Wetzeliella* to *Kisselovia* is not attributable to Costa and Downie, 1979, p.44.

fasciata (Rozen, 1965, p.296-297, pl.2, fig.13; text-fig.4) Costa and Downie, 1979, p.44. Late Eocene. Originally *Wetzeliella clathrata* var. *fasciata,* subsequently *Wetzeliella clathrata* subsp. *fasciata,* then *Kisselovia clathrata* subsp. *fasciata.*

insolens Eaton, 1976, p.292-293, pl.18, fig.1-2. Early Eocene.

"major" Vozzhennikova, 1960, pl.3, fig.1. No diagnosis given. *Nom. nud.* Vozzhennikova, 1967, p.104-105 designated as holotype a specimen which has been destroyed.

**ornata* Vozzhennikova, 1967, p.103-104, pl.42, fig.1-3; pl.43, fig.1-4; pl.44, fig.1-12; pl.45, fig.1-3. Eocene.

subsp. *ornata* (Vozzhennikova, 1967, p.104, pl.42, fig.1-3; pl.43, fig.1-4; pl.44, fig.4-6,9-12) Lentin and Williams, 1973, p.84. Eocene; formerly *Kisselevia ornata* forma *ornata.*

subsp. *reticulata* (Vozzhennikova, 1967, p.104, pl.44, fig.1-3,7-8; pl.45, fig.1-3) Lentin and Williams, 1973, p.84. Eocene; formerly *Kisselevia ornata* forma *reticulata.*

reticulata (Williams and Downie, 1966b, p.187-188, pl.19, fig.3,6; text-fig.48) Lentin and Williams, 1976, p.136. Early Eocene; formerly *Wetzeliella.*

stellata Damassa, 1979a, p.834,837, pl.7, fig.1-7. Early-Middle Eocene.

tenuivirgula (Williams and Downie, 1966b, p.188-189, pl.19, fig.2,4; text-fig. 49) Lentin and Williams, 1976, p.136. Early Eocene; formerly *Wetzeliella.*

subsp. *conopia* (Williams and Downie, 1966b, p.184, pl.18, fig.5) Costa and Downie, 1979, p.44. Early Eocene. Originally *Wetzeliella articulata* var. *conopia;* subsequently *Wetzeliella articulata* subsp. *conopia.*

***KISSELOVIA tenuivirgula* (cont'd)**

subsp. *"crassiramosa"* (Williams and Downie, 1966b) Lentin and Williams, 1976, p.137. NOW *Kisselovia crassiramosa;* formerly *Wetzeliella tenuivirgula* var. *crassiramosa.* The taxon was raised to subspecies status by Lentin and Williams, 1973, p.143. O.C.

subsp. *exouros* Islam, 1983c, p.88, pl.3, fig.3-4. Middle Eocene.

variabilis Bujak *in* Bujak *et al.,* 1980, p.67, pl.17, fig.1-6; text-fig.16. Late Eocene.

KLEITHRIASPHAERIDIUM Davey, 1974, p.55-56. See also *Diversispina* which is a *jr syn.* of this genus.

**corrugatum* Davey, 1974, p.56-57, pl.5, fig.1-5; text-fig.3. Early Barremian.

eoinodes (Eisenack, 1958, p.402, pl.27, fig.3-4) Davey, 1974, p.58. Late Aptian. Originally *Hystrichosphaeridium;* subsequently *Cordosphaeridium.*

fasciatum (Davey and Williams, 1966b, p.90, pl.7, fig.5-6) Davey, 1974, p.57. Barremian; formerly *?Cordosphaeridium.*

loffrense Davey and Verdier, 1976, p.310-312, pl.1, fig.1-6. Senonian.

porosispinum Davey, 1982b, p.29-30, pl.10, fig.8-12. Portlandian-Ryazanian. See also *"Tityrosphaeridium".*

readei (Davey and Williams, 1966b, p.64-65, pl.6, fig.3) Davey and Verdier, 1976, p.314. Cenomanian; formerly *Hystrichosphaeridium.* Davey and Verdier, 1976, p.314 also emended the species diagnosis.

?sarmentum (Davey, 1979b, p.555, pl.1, fig.8-12) Below, 1982c, p.17. Aptian; formerly *Bacchidinium.* See also *Kiokansium.*

"simplicispinum" (Davey and Williams, 1966b, p.59-60, pl.9, fig.3) Davey, 1974, p.57. Barremian; formerly *Hystrichosphaeridium.* Below, 1982c, p.17 considered this species to be a *jr syn.* of *Kleithriasphaeridium eoinodes.*

telaspinosum (Fisher and Riley, 1980, p.322, pl.1, fig.5) Lentin and Williams, 1981, p.165. Volgian; formerly *?Hystrichodinium.* The transfer of this species from *?Hystrichodinium* to *Kleithriasphaeridium* cannot be attributed to Riley, 1979, p.221.

truncatum (Benson, 1976, p.184-185, pl.2, fig.6-9) Stover and Evitt, 1978, p.168. Late Maastrichtian-Early Paleocene; formerly *"Diversispina".*

tubulosum (Cookson and Eisenack, 1969, p.5-6, pl.2, fig.D-F) Stover and Evitt, 1978, p.168. Albian-Cenomanian; formerly *Conosphaeridium.*

"KOFOIDOPSIS" Tasch, 1963, p.333. The type species of this "genus" is based on a mineral grain according to Stover and Evitt, 1978, p.265, 294.

*"*coronata"* Tasch, 1963, p.333-334, pl.1, fig.7-8. Early Permian. This species is based on a mineral grain according to Stover and Evitt, 1978, p.265.

KOMEWUIA Cookson and Eisenack, 1960b, p.257; emend. Dörhöfer and Davies, 1980, p.30; emend. Chen, 1982, p.32. Wiggins, 1975, p.110 considered this genus to be a *jr syn.* of *Kalyptea* Cookson and Eisenack emend. Wiggins. He accordingly transferred the type of the genus *Komewuia, K. glabra,* to *Kalyptea.* Dörhöfer and Davies, 1980, p.30 preferred to retain *Komewuia* and suppress *Kalyptea,* because they believed the original description of *Komewuia* better circumscribed pareodiniacean forms with an antapical horn than that of *Kalyptea.* Lentin and Williams, 1981, p.161 stated, "Since *Kalyptea* and *Komewuia* were erected in the same publication (Cookson and Eisenack, 1960b), the author who first designated the two genera as being synonymous (Wiggins, 1975) had the right of name choice and must be followed (I.C.B.N. Art. 57). Therefore, the generic epithet *Kalyptea* must be retained and *Komewuia* suppressed (E.H. Davies, pers. comm.)." Chen, 1982, p.32 emended *Komewuia* to include only forms with a precingular archeopyle resulting from the loss of a single paraplate. Re-evaluation of the holotype of *K. glabra,* the type of *Komewuia,* confirms this interpretation. Accordingly, *Komewuia* and *Kalyptea* are herein regarded as two distinct and separate genera. See also *Pontiadinium* which is a *jr syn.* of this genus.

"diceras" (Cookson and Eisenack, 1960b; emend. Fisher and Riley, 1980, p.323) Dörhöfer and Davies, 1980, p.30. NOW and formerly *Kalyptea.* The transfer of this species to the genus *Komewuia* by Dörhöfer and Davies, *op.cit.* was rejected by Lentin and Williams, 1981, p.161.

evittii Chen, 1982, p.36,38, pl.2, fig.17-18,21; text-fig.2e-i. ?Callovian-Kimmeridgian.

**glabra* Cookson and Eisenack, 1960b, p.257, pl.39, fig.7-8; emend. Chen, 1982, p.32. See also *Kalyptea.* Probably Tithonian.

inequicornutum (Baltes, 1971, p.5, pl.1, fig.8-12; pl.2, fig.1-3 *ex* Stover and Evitt, 1978, p.180) Chen, 1982, p.36. Early Pliocene. Originally *Diconodinium;* subsequently *Pontiadinium.*

stoveri Chen, 1982, p.38,40, pl.3, fig.22,24-29; text-fig.2p-w. Kimmeridgian-Tithonian.

KOROJONIA Cookson and Eisenack, 1958, p.54. Stover and Evitt, 1978, p.294 considered this to be probably an acritarch genus.

**dubiosa* Cookson and Eisenack, 1958, p.54, pl.12, fig.13. Cenomanian-Early Maastrichtian.

KORYSTOCYSTA Woollam, 1983, p.193-194.

**gochtii* (Sarjeant, 1976a, p.11,13, pl.2, fig.1; pl.3, fig.4; text-fig.2A-C) Woollam, 1983, p.194. Bathonian. Originally *Dichadogonyaulax;* subsequently *Ctenidodinium.* The original type of the genus *Korystocysta, K. kettonensis,* is considered to be a *jr syn.* of *K. gochtii* by Riley and Fenton, 1982, p.199; the latter species therefore becomes the type of the genus.

"kettonensis" Sarjeant, 1976a, p.13,15, pl.1, fig.1-2; pl.3, fig.1-2; pl.6, fig. 1; text-fig.3A-D. Bathonian. Riley and Fenton, 1982, p.199 considered this taxon, as *Dichadogonyaulax kettonensis,* to be a *jr syn.* of *Korystocysta gochtii,* as *Dichadogonyaulax gochtii.* Woollam, 1983, p.193-194 erected the genus *Korystocysta* and designated *K. kettonensis* as the type of the genus. Since we agree with Riley and Fenton, *op.cit., D. gochtii* becomes the type of the genus *Korystocysta.*

norrisii (Pocock, 1972, p.92-93. pl.24, fig.9-12; text-fig.9) Woollam, 1983, p.194. Callovian. Originally *Leptodinium;* subsequently *Dichadogonyaulax,* then *Ctenidodinium.*

pachyderma (Deflandre, 1938b, p.176-178, pl.7, fig.6-10; text-fig.7-10) Woollam, 1983, p.194. Oxfordian. Originally *Gonyaulax;* subsequently *Gonyaulacysta,* then *?Ctenidodinium.*

KYLINDROCYSTA Fenton *et al.,* 1980, p.162.

**spinosa* Fenton *et al.,* 1980, p.162-163, pl.14, fig.10-13; pl.15, fig. 2,4-6. Late Bajocian.

L

LABYRINTHODINIUM Piasecki, 1980, p.67.

**truncatum* Piasecki, 1980, p.67,70, pl.2, fig.9-11; pl.3, fig.2; pl.6, fig.3-4. Middle Miocene.

LACINIADINIUM McIntyre, 1975, p.70.

arcticum (Manum and Cookson, 1964, p.18-19, pl.6, fig.1-4) Lentin and Williams, 1980, p.41. Cenomanian; formerly *Diconodinium*. See also *Diconodinium acutum* which is a *jr syn.* of this species.

biconiculum McIntyre, 1975, p.71, pl.4, fig.5-9. Campanian.

firmum (Harland, 1973, p.669-670, pl.84, fig.8-9,15; text-fig.6) Morgan, 1977, p.136. Late Campanian; formerly *Diconodinium*. This transfer is not attributable to Lentin and Williams, 1980, p.41.

?*inflatum* (Eisenack and Cookson, 1960, p.4, pl.1, fig.12-13) Morgan, 1977, p.136. Late Albian-Cenomanian; formerly *Diconodinium*.

**orbiculatum* McIntyre, 1975, p.70-71, pl.4, fig.10-13. Campanian.

?*ovatum* He Cheng-quan and Li Peng, 1981, p.66, pl.31, fig.13. Late Oligocene. He Cheng-quan and Li Peng, *op. cit.* questionably included this species in *Laciniadinium*.

tenuistriatum (Eisenack and Cookson, 1960, p.4, pl.1, fig.14-16) Morgan, 1977, p.136. Late Albian-Cenomanian; formerly *Diconodinium*.

LACUNODINIUM He Cheng-quan, 1984a, p.768 (translation, p.772).

**foveolatum* He Cheng-quan, 1984a, p.768, pl.1, fig.2a-b,3. Middle Eocene.

LAGENORHYTIS Duxbury, 1979b, p.587 (*nom. subst. pro Speetonia* Duxbury, 1977 *non* Black, 1971); emend. Piasecki, 1984, p.149.

**delicatula* (Duxbury, 1977, p.49, pl.12, fig.1-2,4-5; text-fig.18) Duxbury, 1979b, p.587; emend. Piasecki, 1984, p.149-150. Valanginian; formerly *Speetonia*.

LANTERNA Dodekova, 1969, p.16.

**bulgarica* Dodekova, 1969, p.16-17, pl.2, fig.3-6; pl.3, fig.1; text-fig.B,Db. Tithonian.

?pattei (Valensi, 1948, p.539, fig.1) Brideaux and Fisher, 1976, p.25. Bathonian. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium*. Stover and Evitt, 1978, p.59 considered this to be a "provisionally accepted species".

?saturnalis Brideaux and Fisher, 1976, p.24-25, pl.6, fig.1-10; pl.7, fig.1-13. Late Oxfordian-Late Kimmeridgian. Stover and Evitt, 1978, p.59 considered this to be a "provisionally accepted species".

?spinosa Dodekova, 1969, p.17-18, pl.3, fig.2-3,5-6,9,12; text-fig.C,Da. Tithonian. Stover and Evitt, 1978, p.59 considered this to be a "provisionally accepted species".

sportula Dodekova, 1969, p.18-19, pl.3, fig.4,7,10-11; text-fig.Dc. Tithonian.

LANTERNOSPHAERIDIUM Morgenroth, 1966a, p.37; emend. Stover and Evitt, 1978, p.168. Norvick *in* Norvick and Burger, 1976, p.50 considered this genus to be a *jr syn.* of *Amphorosphaeridium*. This view was rejected by Stover and Evitt, 1978, p.169.

"axiale" (Eisenack, 1965) Morgenroth, 1966a, p.38-39. NOW *Fibrocysta;* formerly *Cordosphaeridium*.

"bipolare" (Cookson and Eisenack, 1965b) De Coninck, 1969, p.38. NOW *Fibrocysta;* formerly *Cordosphaeridium*. The transfer of this species to *Amphorosphaeridium* by Davey, 1969c, p.35, was rejected by Lentin and Williams, 1977b, p.95.

"cinctum" (Cookson and Eisenack, 1982). NOW *?Fibrocysta*.

doubingeri Troncoso *in* Troncoso and Doubinger, 1980, p.103, pl.3, fig.7-9. Maastrichtian-Danian.

"essentiale" (De Coninck, 1969). NOW *?Kenleyia*.

"hirundo" (Eisenack, 1958) Corradini, 1973, p.154. NOW *?Cordosphaeridium*. Originally *Hystrichosphaeridium;* subsequently *Achomosphaera*.

**lanosum* Morgenroth, 1966a, p.38, pl.10, fig.10-11. Early Eocene.

"lappaceum" (Drugg, 1970b). NOW *Fibrocysta*.

"licium" (Jain *et al.*, 1975). NOW *Fibrocysta*.

"morgenrothii" (Corradini, 1973). NOW *Fibrocysta*.

LANTERNOSPHAERIDIUM **(cont'd)**

"mutinense" (Corradini, 1973). NOW *?Fibrocysta.*

"ovale" (Hansen, 1977). NOW *Fibrocysta.*

"personatum" (Corradini, 1973). NOW *?Operculodinium.*

"radiatum" (Morgenroth, 1966a). NOW *Fibrocysta.*

"vectense" (Eaton, 1976). NOW *Fibrocysta.*

LATICAVODINIUM Wilson and Sarjeant *in* Sarjeant, 1984c, p.127.

**oligacanthum* (W. Wetzel, 1952, p.402, pl.A, fig.8; text-fig.21-22) Wilson and Sarjeant *in* Sarjeant, 1984c, p.127-129. Danian. Originally *Hystrichosphaeridium,* subsequently *Baltisphaeridium,* then *Cleistosphaeridium.* See *"Cleistosphaeridium oligacanthum"* for present assignment of the subspecies of this species. At the time of the transfer, the diagnosis was emended by Wilson and Sarjeant, 1984 *in* Sarjeant, 1984c, p.127-129.

LEBERIDOCYSTA Stover and Evitt, 1978, p.59-60. The contention of Mehrotra and Sarjeant, 1984c, p.46, that this genus is a *jr syn.* of *Polygonifera,* is herein rejected. Instead, we accept the generic circumscription of Stover and Evitt, 1978, p.59-60 which included a description of the operculum. The nature of the operculum in *Polygonifera* is unknown.

**chlamydata* (Cookson and Eisenack, 1962b, p.496, pl.7, fig.1-3, 5-8) Stover and Evitt, 1978, p.60. Albian-Cenomanian; formerly *?Hexagonifera.* The transfer of this species to *Polygonifera* by Mehrotra and Sarjeant, 1984c, p.48 is herein rejected.

defloccata (Davey and Verdier, 1973, p.198, pl.3, fig.6,8) Stover and Evitt, 1978, p.60. Late Albian-Early Cenomanian. Originally *Hexagonifera;* subsequently *Thalassiphora.* The transfer of this species to *Disphaeria* Cookson and Eisenack by Yun, 1981, p.70 is herein rejected and the species is retained in *Leberidocysta.* The transfer of the species to *Craspedodinium* by Mehrotra and Sarjeant, 1984c, p.50 is herein rejected.

eisenackii (Mehrotra and Sarjeant, 1984c) *comb. nov.*
1984c *Polygonifera eisenackii* Mehrotra and Sarjeant, p.46-48, pl.1, fig. 1-7; pl.2, fig.1-7; text-fig.1-3. Aptian.

?laticaudata Vozzhennikova, 1967, p.125-126, pl.54, fig.1) Stover and Evitt, 1978, p.60. Santonian; formerly *?Hexagonifera.* Stover and Evitt, 1978, p.60 considered this to be a "provisionally accepted species". The contention of Mehrotra and Sarjeant, 1984c, p.50, that this species should be returned to *Hexagonifera,* is herein rejected.

LEBERIDOCYSTA (cont'd)

?pergamentacea (Burger, 1980a, p.88, pl.47, fig.2-3) Burger, 1980b, p.272. Aptian; formerly *Palaeostomocystis*. At the time of the transfer, Burger, *op.cit.* questionably included this species in *Leberidocysta*. The transfer of this species to *Craspedodinium* by Mehrotra and Sarjeant, 1984c, p.50 is herein rejected.

?scabrata (Jain and Taugourdeau-Lantz, 1973, p.64, pl.4, fig.11-12) Stover and Evitt, 1978, p.60. Early Cretaceous; formerly *?Hexagonifera*. Stover and Evitt, 1978, p.60 considered this to be a "provisionally accepted species". The contention of Mehrotra and Sarjeant, 1984c, p.50 that this species should be returned to *Hexagonifera* is herein rejected.

LECANIELLA Cookson and Eisenack, 1962a, p.269. Stover and Evitt, 1978, p.294 considered this genus to be "not a dinoflagellate, although possibly algal."

dictyota Cookson and Eisenack, 1962a, p.270, pl.37, fig.18-20. Aptian-Cenomanian.

foveata Ch. Singh, 1971, p.426, pl.79, fig.5-10; pl.80, fig.1. Late Albian.

**margostriata* Cookson and Eisenack, 1962a, p.269-270, pl.37, fig.16-17. Albian-Cenomanian.

LEIPOKATIUM Bradford, 1975, p.3066. This genus was valid when published; it is a cyst form taken from sediments of questionable age and was treated as a fossil. The contention by Harland and Reid, 1980, p.223 that a Latin diagnosis is required, was rejected by Lentin and Williams, 1981, p.169.

**invisitatum* Bradford, 1975, p.3067, fig.8-16. Recent.

LEJEUNECYSTA Artzner and Dörhöfer, 1978, p.1381 (*nom. subst. pro Lejeunia* Gerlach, 1961, p.169); emend. Bujak *in* Bujak *et al.*, 1980, p.68. See also *Lejeunia*.

"aechmophora" (Benedek, 1972) Wilson and Clowes, 1980, p.63. NOW *Gerlachidium*. The retention of this species in *"Lejeunia"* by Stover and Evitt, 1978, p.112 and the subsequent transfer to *Lejeunecysta* by Wilson and Clowes, 1980, p.63 and Bujak and Davies, 1983, p.162 are herein rejected. See also *?Wilsonidium*.

"applanata" (Bradford, 1977) Artzner and Dörhöfer, 1978, p.1381. NOW *Trinovantedinium*.

beninensis Biffi and Grignani, 1983, p.128-130, pl.2, fig.4-5,8; text-fig.2A. Oligocene.

brassensis Biffi and Grignani, 1983, p.130, pl.1, fig.1-3; text-fig.2B. Oligocene.

LEJEUNECYSTA (cont'd)

cinctoria (Bujak *in* Bujak *et al.*, 1980, p.68-69, pl.18, fig.1-4; text-fig.17) Lentin and Williams, 1981, p.169. Late Eocene; formerly *Lejeunia.*

communis Biffi and Grignani, 1983, p.130-132, pl.1, fig.4-7; text-fig.2C. Oligocene.

diversiforma (Bradford, 1977, p.49,52,55-56, fig.4:1-4,6-7; fig.6:1-3) Artzner and Dörhöfer, 1978, p.1381. Recent; formerly *Lejeunia.*

subsp. *muscatensis* (Bradford, 1977, p.55-56, fig.6:1-3) Artzner and Dörhöfer, 1978, p.1381. Recent; formerly *Lejeunia.*

fallax (Morgenroth, 1966b, p.2-3, pl.1, fig.6-7) Artzner and Dörhöfer, 1978, p.1381; emend. Biffi and Grignani, 1983, p.132. Middle Oligocene; formerly *Lejeunia.*

"*gaditana*" (Riegel, 1974) Wilson and Clowes, 1980, p.63. We herein reject the transfer of this species from *Deflandrea* to *Lejeunecysta,* and follow Lentin and Williams, 1981, p.223 who transferred the species to *Phelodinium.*

globosa Biffi and Grignani, 1983, p.132-134, pl.2, fig.6-7,10; text-fig.2E. Oligocene.

granosa Biffi and Grignani, 1983, p.134, pl.4, fig.1-2; text-fig.2D. Oligocene.

**hyalina* (Gerlach, 1961, p.169, pl.26, fig.10-11; emend. Kjellström, 1972, p.469) Artzner and Dörhöfer, 1978, p.1381; emend. Sarjeant, 1984b, p.89-90. Late Oligocene; formerly *Lejeunia.*

"*laevigata*" (Malloy, 1972) Wilson and Clowes, 1980, p.63. We herein reject the transfer of this species from *Lejeunia* to *Lejeunecysta* and follow Bujak and Davies, 1983, p.163 who transferred it to *Senegalinium.*

lata Biffi and Grignani, 1983, p.134-136, pl.3, fig.1-2,4; text-fig.2G. Oligocene.

"*magnifica*" (Stanley, 1965) Artzner and Dörhöfer, 1978, p.1381. NOW and formerly *Phelodinium.* Originally *Deflandrea;* subsequently *Lejeunia.* The transfer of this species to *Senegalinium* by Harland, 1977a, p.188 was rejected by Lentin and Williams, 1977b, p.96 because of the nature of the endocyst and archeopyle.

"*paratenella*" (Benedek, 1972, p.41-42, pl.5, fig.8; text-fig.18) Artzner and Dörhöfer, 1978, p.1381. Late Oligocene; formerly *Lejeunia.* Benedek and Sarjeant, 1981, p.336-338 considered this species to be a *jr syn.* of *Selenopemphix selenoides.* See also *Trinovantedinium olivum* which is a *jr syn.* of this species.

LEJEUNECYSTA **(cont'd)**

"pentagonalis" (Corradini, 1973) Artzner and Dörhöfer, 1978, p.1381. NOW and formerly *Phelodinium*. Originally *Deflandrea;* subsequently *Lejeunia.* The transfer of this species to *Senegalinium* by Harland, 1977a, p.189 was rejected by Lentin and Williams, 1977b, p.96 because of the nature of the endocyst and archeopyle.

?psilodora (Benedek, 1972, p.42, pl.6, fig.5) Artzner and Dörhöfer, 1978, p.1381. Middle Oligocene; formerly *Lejeunia.* Stover and Evitt, 1978, p.112 considered this (as *Lejeunia psilodora)* to be a "provisionally accepted species".

pulchra Biffi and Grignani, 1983, p.135, pl.2, fig.1-3; text-fig.2I. Oligocene.

sabrina (Reid, 1977, p.441-442, pl.2, fig.15-17) Bujak, 1984, p.193. Recent; formerly *Trinovantedinium.* Harland, 1981, p.68 considered this species to represent the encysted stage of *Protoperidinium leonis* (Pavillard) Balech, 1974.

spatiosa (Morgenroth, 1966b, p.3-4, pl.1, fig.5) Wilson and Clowes, 1980, p.63. Early Oligocene. Originally *Lejeunia;* subsequently *Maduradinium.* Stover and Evitt, 1978, p.112 rejected the transfer of this species to *Maduradinium* by Lentin and Williams, 1976, p.73.

tenella (Morgenroth, 1966b, p.4-5, pl.1, fig.8-9) Wilson and Clowes, 1980, p.63. Early Oligocene. Originally *Lejeunia;* subsequently *Vozzhennikovia.* Stover and Evitt, 1978, p.112 rejected the transfer of this species to *Vozzhennikovia* by Lentin and Williams, 1976, p.67. See also *Dioxya.*

"tricuspis" (O. Wetzel, 1933a) Artzner and Dörhöfer, 1978, p.1381-1382. NOW and formerly *Phelodinium.* Originally *Peridinium;* subsequently *Lejeunia,* then *Astrocysta,* then *Lejeunia.* The transfer of this species to *Senegalinium* by Harland, 1977a, p.188 was rejected by Lentin and Williams, 1977b, p.96 because of the nature of the endocyst and archeopyle. If Lejeune-Carpentier and Sarjeant, 1981, p.20, pl.6, fig.5 are correct and this species represents an autocyst, then it should be retained in *Lejeunecysta.* These authors based their emendation of the species on this characteristic.

"LEJEUNIA" Gerlach, 1961, p.169; emend. Kjellström, 1972, p.467; emend. Lentin and Williams, 1976, p.68. *Jr hom.* of *Lejeunea* Libert, 1820. Species formerly included within this genus have been transferred to *Lejeunecysta* Artzner and Dörhöfer, with the exception of those species listed below.

"aechmophora" (Benedek, 1972). NOW *Gerlachidium.* See also *Lejeunecysta* and *?Wilsonidium.*

"ampla" (Harland, 1973). NOW *Palaeoperidinium.*

"applanata" (Bradford, 1977). NOW *Trinovantedinium.*

"LEJEUNIA" (cont'd)

"cretacea" (Pocock, 1962). NOW *Palaeoperidinium.*

"elongata" (Jiabo, 1978). NOW *Ceratiopsis.*

"fissurata" (Jiabo, 1978). NOW *Ceratiopsis.*

"gaditana" (Riegel, 1974) Lentin and Williams, 1980, p.41. NOW *Phelodinium;* formerly *Deflandrea.* See also *Lejeunecysta.*

"kozlowskii" Gorka, 1963, p.41, pl.5, fig.4. Late Maastrichtian. This species was transferred to the genus *"Astrocysta"* by Davey, 1970, p.360. Harker and Sarjeant, 1975, p.223 considered *"Lejeunia kozlowskii"* to be a *jr syn.* of *Lejeunia tricuspis* (O. Wetzel) Gorka, which species is now included in *Phelodinium.* The transfer of this species to *Senegalinium* by Harland, 1977a, p.189 was rejected by Lentin and Williams, 1977b, p.96, because of the nature of the endocyst and archeopyle.

"laevigata" (Malloy, 1972) Lentin and Williams, 1976, p.71. NOW *Senegalinium.*

"magnifica" (Stanley, 1965) Lentin and Williams, 1976, p.71. NOW *Phelodinium;* formerly *Deflandrea.*

"parva" (Harland, 1973). NOW *Palaeoperidinium.*

"pentagonalis" (Corradini, 1973) Lentin and Williams, 1976, p.71. NOW *Phelodinium;* formerly *Deflandrea.*

"spatiosa" (Morgenroth, 1966b). NOW *Lejeunecysta.* The transfer of this species to *Maduradinium* by Lentin and Williams, 1976, p.73 was rejected by Stover and Evitt, 1978, p.233, because of the uncertainty of the status of *Maduradinium.*

"tricuspis" (O. Wetzel, 1933a) Gorka, 1963, p.40. NOW *Phelodinium.* Originally *Peridinium.* See also *Astrocysta.*

LENTINIA Bujak *in* Bujak *et al.*, 1980, p.69.

extensa (Stover, 1973, p.178-179, pl.5, fig.4a-c,5a-d,6) Bujak and Davies, 1983, p.162. Middle-Late Eocene. Originally *Deflandrea;* subsequently *?Vozzhennikovia,* then *Dioxya.*

**serrata* Bujak *in* Bujak *et al.*, 1980, p.71-72, pl.18, fig.7-12; text-fig.18-19. Late Eocene.

wetzelii (Morgenroth, 1966a, p.9, pl.1, fig.4-5) Bujak *in* Bujak *et al.*, 1980, p.72. Early Eocene; formerly *Deflandrea.* O.C.

LEPTODINIUM Klement, 1960, p.45; emend. Sarjeant, 1966b, p.133; emend. Wall, 1967, p.104; emend. Sarjeant, 1969, p.11-12; emend. Stover and Evitt, 1978, p.169-170; emend. Sarjeant, 1982, p.37.

"aceras" (Eisenack, 1958) Gitmez and Sarjeant, 1972, p.215. NOW *Acanthaulax;* formerly *Gonyaulax.*

"aculeatum" (Wall, 1967). NOW *Impagidinium.*

"alectrolophum" (Sarjeant, 1966b). NOW *Impagidinium.*

?amabile (Deflandre, 1939, p.143, pl.6, fig.8) Sarjeant, 1969, p.12. Kimmeridgian; formerly *Gonyaulax.* This species was transferred to *Gonyaulacysta* by Dodekova, 1971, p.7; this transfer was rejected by Lentin and Williams, 1973, p.86. Stover and Evitt, 1978, p.171 considered this to be a "problematical species". Sarjeant, 1982, p.38 considered this to be a "provisionally accepted species".

ambiguum (Deflandre, 1939, p.144, pl.6, fig.2) Helenes, 1984, p.131. Kimmeridgian. Originally *Gonyaulax;* subsequently *Gonyaulacysta,* then *Millioudodinium.*

?antigonium Ioannides *et al.*, 1977, p.456-457, pl.3, fig.7-8; text-fig.10. Kimmeridgian. Stover and Evitt, 1978, p.170 considered this to be a "provisionally accepted species".

arcuatum Klement, 1960, p.48, pl.6, fig.5-6; emend. Gitmez, 1970, p.270; emend. Sarjeant, 1984a, p.163-164, pl.1, fig.1-2. Middle Oxfordian.

asymmetricum Morgan, 1980, p.25-26, pl.17, fig.1-5. Aptian-Middle Albian.

?bacculatum Baltes, 1971, p.3, pl.1, fig.4-5. Early Pliocene. See also *Millioudodinium* and *?Rhynchodiniopsis.* We agree with Helenes, 1984, p.131, that, pending re-examination, this species should questionably be retained in *Leptodinium.*

cancellatum Brideaux and McIntyre, 1975, p.21-22, pl.5, fig.7-9. Middle Albian.

"churchillii" Harland, 1968, p.548-551, fig.12-13,22-24. Holocene. Reid, 1974, p.599 stated, "The single specimen on which Harland (1968) based his new species *Leptodinium churchillii* was seen on examination to be referable to the *'nodosa'* form of *"Spiniferites bentori"*. The transfer of this species to *Impagidinium* by Matsuoka, 1983a, p.7 was therefore unnecessary.

clathratum (Cookson and Eisenack, 1960b, p.246-247, pl.37, fig.5; text-fig.1) Sarjeant, 1969, p.12. Probably Tithonian; formerly *Gonyaulax.* This species was transferred to *Gonyaulacysta* by Dodekova, 1971, p.10; this transfer was rejected by Lentin and Williams, 1973, p.86.

LEPTODINIUM (cont'd)

?crassinervum (Deflandre, 1939, p.144, pl.6, fig.5) Sarjeant, 1969, p.12. Kimmeridgian; formerly *Palaeoperidinium*. Stover and Evitt, 1978, p.170 considered this to be a "problematical species". Sarjeant, 1982, p.38 considered this to be a "provisionally accepted species".

"cristatum" (May, 1980). NOW *Impagidinium*.

"cristatum" (Riley *in* Fisher and Riley, 1980). *Jr hom.* of *Leptodinium cristatum* May, 1980. NOW *Cribroperidinium cristatum*. See also *Leptodinium volgense nom. subst.*

"deflandrei" (Riley *in* Fisher and Riley, 1980) Lentin and Williams, 1981, p.173. NOW *Cribroperidinium;* formerly *Gonyaulacysta*. See also *Millioudodinium*.

?delicatum (Davey, 1969a, p.123-124, pl.1, fig.7-8; text-fig.10A-B) Sarjeant, 1969, p.12. Cenomanian; formerly *Gonyaulacysta*. Sarjeant, 1969, p.12 incorrectly cited the date for the publication of this species as 1968; Davey's paper actually appeared early in 1969. Stover and Evitt, 1978, p.170 considered this to be a "provisionally accepted species".

"dispertitum" (Cookson and Eisenack, 1965a). NOW *Impagidinium*.

"egemenii" (Gitmez, 1970). NOW *Tubotuberella*.

"elegans" (Cookson and Eisenack, 1965a). NOW *Impagidinium*.

episomum (Sarjeant, 1966b, p.118-119, pl.13, fig.9-10; text-fig.27) Helenes, 1984, p.131. Late Barremian. Originally *Gonyaulacysta;* subsequently *Millioudodinium,* then *Rhynchodiniopsis*.

eumorphum (Cookson and Eisenack, 1960b, p.246, pl.37, fig.1-3; text-fig.3) Sarjeant, 1969, p.12. Late Jurassic; formerly *Gonyaulax*.

flammeolum Morgan, 1980, p.26, pl.17, fig.14-17. Aptian-Albian.

formosum Ch. Singh, 1983, p.140, pl.48, fig.6-8; text-fig.17. Early Cenomanian.

freakei (Sarjeant, 1963c, p.85-86, pl.1, fig.1-3) Sarjeant, 1969, p.12. Oxfordian; formerly *Gonyaulax*.

globosum Olaru, 1978, p.85, pl.12, fig.14. Late Eocene.

"?gongylos" (Sarjeant, 1966b) Stover and Evitt, 1978, p.170. NOW *Rhynchodiniopsis;* formerly *Gonyaulacysta*. Stover and Evitt, 1978, p.170 considered this to be a "provisionally accepted species" of *Leptodinium*.

LEPTODINIUM **(cont'd)**

?hadrum (Sarjeant, 1966b, p.119-121, pl.14, fig.1; text-fig.28) Helenes, 1984, p.131. Late Barremian. Originally *Gonyaulacysta;* subsequently *Millioudodinium,* then *Rhynchodiniopsis.* At the time of the transfer, Helenes, *op.cit.* questionably included the species in *Leptodinium.*

"?hyalodermopse" (Cookson and Eisenack, 1958) Stover and Evitt, 1978, p.170. NOW *Rhynchodiniopsis.* Originally *Gonyaulax;* subsequently *Gonyaulacysta.* Stover and Evitt, 1978, p.170 considered this to be a "provisionally accepted species" of *Leptodinium.*

impenseum Yu Jingxian, 1982, p.242, pl.2, fig.10-11. Late Jurassic-Early Cretaceous.

"incompositum" (Drugg, 1970b) Lentin and Williams, 1973, p.87. NOW *Corrudinium;* formerly *Gonyaulacysta.*

kubassense Fedorova, 1980, p.71, pl.1, fig.6-6a. Aptian.

latolineatum Yun, 1981, p.10-11, pl.9, fig.10,15; text-fig.2. Early Santonian.

"maculatum" (Cookson and Eisenack, 1961b). NOW *Impagidinium.*

mamilliferum (Deflandre, 1939, p.143, pl.6, fig.1) Helenes, 1984, p.131. Kimmeridgian. Originally *Gonyaulax;* subsequently *Gonyaulacysta,* then *?Millioudodinium,* then *?Rhynchodiniopsis.*

"margaritiferum" (Cookson and Eisenack, 1960a) Sarjeant, 1969, p.31. NOW *Impagidinium;* formerly *Gonyaulax.*

membranigerum Gerlach, 1961, p.162-164, pl.26, fig.1-4,7; text-fig.4-5; emend. Sarjeant, 1984b, p.75-76, pl.1, fig.1,3 (lectotype); pl.2, fig.1-2; pl.3, fig.3; pl.4, fig.6; text-fig.1. Late Oligocene. See also *?Impagidinium.*

?micropunctatum Jain and Millepied, 1975, p.139, pl.2, fig.32-33. Early-?Late Aptian. Stover and Evitt, 1978, p.170 considered this to be a "problematical species". Lentin and Williams, 1981, p.173 rejected the contention by Below, 1981a, p.107 that *?L. micropunctatum* is a *jr syn.* of *Oodnadattia tuberculata* Eisenack and Cookson. Sarjeant, 1982, p.38 considered this to be a "provisionally accepted species".

millioudii (Sarjeant, 1963c, p.86-88, pl.1, fig.4-7) Sarjeant, 1969, p.13. Oxfordian; formerly *Gonyaulax.* O.C.

mirabile Klement, 1960, p.48-50, pl.6, fig.7-10; text-fig.25-27; emend. Sarjeant, 1984a, p.164-166, pl.4, fig.1-2. Middle Oxfordian. The transfer of this species to *Gonyaulacysta* by Dodekova, 1967, p.19 was rejected by Lentin and Williams, 1973, p.87.

modicum Brideaux and McIntyre, 1975, p.22, pl.5, fig.10-15. Middle Albian.

***LEPTODINIUM* modicum (cont'd)**

subsp. *denticulatum* Brideaux, 1977, p.8, pl.1, fig.10-11. Barremian.

?mosaicum (Downie, 1957, p.424, pl.20, fig.7; text-fig.2f) Sarjeant, 1969, p.13; emend. Sarjeant, 1976c, p.6-7. Middle Kimmeridgian. Originally *Palaeoperidinium;* subsequently *Gonyaulacysta.* Stover and Evitt, 1978, p.170 considered this to be a "provisionally accepted species".

"multiplexum" (Wall and Dale, 1968). NOW *Impagidinium.*

"norrisii" (Pocock, 1972). NOW *Korystocysta.*

"ovum" (Sah *et al.,* 1970). NOW *?Impagidinium.*

"panneum" (Norris, 1965). NOW *Ctenidodinium.*

"paradoxum" (Wall, 1967). NOW *Impagidinium.*

"patulum" (Wall, 1967). NOW *Impagidinium.*

"pectinigerum" (Gocht, 1970) Fenton *et al.,* 1980, p.158. NOW *Hystrichogonyaulax pectinigera;* formerly *Leptodinium subtile* subsp. *pectinigerum.* The retention of this taxon in *Leptodinium* was rejected by Lentin and Williams, 1981, p.174, whereas they accepted the transfer to *Hystrichogonyaulax* by Stover and Evitt, 1978, p.163.

"?perforans" (Cookson and Eisenack, 1958) Stover and Evitt, 1978, p.170. NOW *?Cribroperidinium.* Originally *Gonyaulax;* subsequently *Gonyaulacysta.* See also *Rhynchodiniopsis.* Stover and Evitt, 1978, p.69 considered this to be a "provisionally accepted species" of *Leptodinium.*

?pilum (Gocht, 1959, p.56, pl.6, fig.14; pl.8, fig.8) Sarjeant, 1969, p.13. Valanginian. At the time of the transfer, Sarjeant, *op.cit.* questionably included this species in *Leptodinium.* Originally *Palaeoperidinium;* subsequently *Gonyaulacysta.* Stover and Evitt, 1978, p.171 considered this to be a "problematical species".

porosum (Lejeune-Carpentier, 1946, p.193,196; text-fig.6) Sarjeant, 1969, p.13; emend. Lejeune-Carpentier and Sarjeant, 1981, p.7-8. Senonian; formerly *Gonyaulax.* Stover and Evitt, 1978, p.171 considered this to be a "problematical species".

?punctatum Baltes, 1971, p.3, pl.1, fig.2-3,6-7. Early Pliocene. See also *Millioudodinium.* We agree with Helenes, 1984, p.131 that, pending reexamination, this species should questionably be retained in *Leptodinium.*

quadrangulum Yu Jingxian, 1982, p.242, pl.4, fig.10,13,15. Late Jurassic-Early Cretaceous.

"regale" (Gocht, 1970b). NOW *Hystrichogonyaulax.*

***LEPTODINIUM* (cont'd)**

?reticulatum (Nagy, 1969, p.293, pl.1, fig.7,10) Lentin and Williams, 1973, p.88. Late Pannonian; formerly *Gonyaulax*. Stover and Evitt, 1978, p.171 considered *L. reticulatum* to be a "problematical species". Sarjeant, 1982, p.38 considered the species to be a "provisionally accepted species".

"saepitum" (Ashraf, 1979). NOW *Hystrichogonyaulax.*

"schizoblatum" (Norris, 1965). NOW *Dichadogonyaulax.*

"setcheyense" (Sarjeant, 1976c) Stover and Evitt, 1978, p.170. NOW *Rhynchodiniopsis;* formerly *Gonyaulacysta.*

?simplex Burger, 1980a, p.84, pl.42, fig.1-5. Aptian. Sarjeant, 1982, p.38 considered this to be a "provisionally accepted species".

"sphaericum" (Wall, 1967). NOW *Impagidinium.*

"strialatum" (Wall, 1967). NOW *Impagidinium.*

"striatum" (Clarke and Verdier, 1967) Sarjeant, 1969, p.13. NOW *Pterodinium;* formerly *Gonyaulacysta.* See also *Impagidinium.*

**subtile* Klement, 1960, p.46-47, pl.6, fig.1-4; text-fig.23-24. Early Kimmeridgian.

subsp. *"pectinigerum"* (Gocht, 1970b). NOW *Hystrichogonyaulax pectinigera.*

?tenuicornutum Cookson and Eisenack, 1962b, p.478, pl.3, fig.12-13; text-fig. 1a-b. Albian. The transfer of this species to *Gonyaulacysta* by Sarjeant, 1969, p.11 was rejected by Stover and Evitt, 1978, p.160 who considered *?Leptodinium tenuicornutum* to be a "provisionally accepted species".

"victorianum" (Cookson and Eisenack, 1965a). NOW *Impagidinium.*

"volgense" Lentin and Williams, 1981, p.175 *nom. subst. pro L. cristatum* (Riley *in* Fisher and Riley, 1980, p.320, pl.1, fig.8,12) Lentin and Williams, 1981, p.175 *non L. cristatum* May, 1980. NOW *Cribroperidinium cristatum;* formerly *Gonyaulacysta.* We herein transfer this species to *Cribroperidinium,* where the original specific epithet has priority.

LIASIDIUM Drugg, 1978, p.69

**variabile* Drugg, 1978, p.69-70, pl.4, fig.10, pl.5, fig.1-9. Sinemurian.

"LINGULASPHAERA" Drugg, 1970b, p.817. *Jr syn.* of *Diphyes* according to Stover and Evitt, 1978, p.38. These authors, *op.cit.* (p.39) transferred the type of the genus and single species, *Lingulasphaera spinula,* to *Diphyes.*

LINGULODINIUM Wall, 1967, p.109; emend. Wall and Dale *in* Wall *et al.*, 1973, p.23-24. See also *Trioperculodinium* which is a *jr syn.* of this genus.

funginum (Morgenroth, 1966a, p.17, pl.3, fig.7-8) Islam, 1983b, p.341. Early Eocene; formerly *Baltisphaeridium.*

**machaerophorum* (Deflandre and Cookson, 1955, p.274, pl.9, fig.4,8) Wall, 1967, p.109. Miocene. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium.* See also *Cleistosphaeridium disjunctum, Hystrichosphaeridium ashdodense* and *H. redonense* which are *jr synonyms* of this species.

subsp. *filiforme* (Rossignol, 1964, p.91, pl.2, fig.13) Lentin and Williams, 1973, p.89. Pleistocene; formerly *Baltisphaeridium machaerophorum* var. *filiforme.*

subsp. *megacanthum* (Rossignol, 1964, p.91, pl.2, fig.15) Lentin and Williams, 1973, p.89. Pleistocene; formerly *Baltisphaeridium machaerophorum* var. *megacanthum.*

subsp. *"strangulatum"* (Rossignol, 1964) Lentin and Williams, 1973, p.89. NOW *Lingulodinium strangulatum;* formerly *Baltisphaeridium machaerophorum* var. *strangulatum.* This taxon was raised to the subspecies level by Lentin and Williams, 1973, p.89.

pugiatum (Drugg, 1970b, p.819; text-fig.16D-E) Wall and Dale *in* Wall *et al.*, 1973, p.24. Oligocene; formerly *Operculodinium.*

?pycnospinosum (Benedek, 1972, p.32, pl.12, fig.14) Stover and Evitt, 1978, p.172; emend. Benedek and Sarjeant, 1981, p.343-344, fig.10/1 (holotype). Middle-Late Oligocene; formerly *Impletosphaeridium.* Stover and Evitt, 1978, p.172 considered this to be a "provisionally accepted species" and possibly a *jr syn.* of *Lingulodinium machaerophorum.* Benedek and Sarjeant, *op.cit.* contended that the species is unquestionably *Lingulodinium,* but not a *jr syn.* of *L. machaerophorum.*

sadoense Matsuoka, 1983b, p.124, pl.10, fig.1-7. Early Pleistocene.

siculum (Drugg, 1970b, p.820; text-fig.16F-G) Wall and Dale *in* Wall *et al.*, 1973, p.24. Oligocene; formerly *Trioperculodinium.*

solarum (Drugg, 1970b, p.819; text-fig.16A-C) Wall and Dale *in* Wall *et al.*, 1973, p.24. Oligocene; formerly *Operculodinium.*

strangulatum (Rossignol, 1964, p.92, pl.2, fig.16) Islam, 1983c, p.90. Pleistocene. Originally *Baltisphaeridium machaerophorum* var. *strangulatum;* subsequently *Lingulodinium machaerophorum* subsp. *strangulatum.* This taxon was raised to the species level by Islam, 1983c, p.90.

***LINGULODINIUM* (cont'd)**

xanthium (Benedek, 1972, p.27-28, pl.9, fig.8; text-fig.9) Benedek and Sarjeant, 1981, p.342, fig.9/5 (holotype). Middle-Late Oligocene. Originally *Cordosphaeridium;* subsequently *Operculodinium.* At the time of the transfer, Benedek and Sarjeant, 1981, p.342-343 emended the diagnosis.

LITHODINIA Eisenack, 1935, p.175; emend. Gocht, 1975b, p.353.

"*acanthosphaera*" (Sarjeant, 1961a) Lentin and Williams, 1977, p.100. NOW *?Meiourogonyaulax.* Originally *Gonyaulax;* subsequently *Acanthaulax.*

"*araneosa*" (Muir and Sarjeant, 1978) Riley, 1979, p.221. The transfer of this species from *Meiourogonyaulax* to *Lithodinia* was rejected by Lentin and Williams, 1981, p.181 and the species was retained in *Meiourogonyaulax.*

?areolata (Klement, 1960, p.76-77, pl.8, fig.5-9) Sarjeant, 1984a, p.166. Early Kimmeridgian; formerly *Epiplosphaera.* At the time of the transfer, Sarjeant, *op.cit.* questionably included this species in *Lithodinia.*

"*arktikos*" Fenton, 1981, p.251,253, pl.2, fig.1-2; pl.3, fig.1. Late Bathonian. *Jr syn.* of *Lithodinia borealis* according to Riley and Fenton, 1982, p.200. See Sarjeant, 1980b, p.123 for discussion of the latter species.

bathonica Conway, 1978, p.349, pl.2, fig.4-7. Late Bathonian.

borealis (Sarjeant, 1980b, p.123-124; holotype figured as *Meiourogonyaulax decapitata* (Wetzel, 1967) Sarjeant, 1972 by Sarjeant, 1972, pl.5, fig.3; text-fig.5) Riley and Fenton, 1982, p.200. Late Bathonian; formerly *Meiourogonyaulax.*

"*bulloidea*" (Cookson and Eisenack, 1960b) Gocht, 1976, p.334. NOW *Meiourogonyaulax;* formerly *Gonyaulax.*

"*callomonii*" (Sarjeant, 1972) Gocht, 1976, p.334. NOW and formerly *Meiourogonyaulax.*

"*cantrellii*" (Sarjeant, 1972) Gocht, 1976, p.334. NOW and formerly *?Meiourogonyaulax.*

"*caytonensis*" (Sarjeant, 1959) Gocht, 1976, p.334. NOW and formerly *Meiourogonyaulax.*

"*cristulata*" (Sarjeant, 1959) Gocht, 1976, p.334. NOW and formerly *?Meiourogonyaulax.*

"*decapitata*" (W. Wetzel, 1967) Gocht, 1976, p.334. NOW and formerly *Meiourogonyaulax.*

LITHODINIA (cont'd)

"deflandrei" (Sarjeant, 1968) Gocht, 1976, p.334. NOW and formerly *Meiourogonyaulax.*

"dicryptos" (Gitmez and Sarjeant, 1972) Gocht, 1976, p.334. NOW *Canningia;* formerly *Meiourogonyaulax.*

"ghermanii" (Beju, 1971) Gocht, 1976, p.334. NOW and formerly *Meiourogonyaulax.*

helbyi Morgan, 1980, p.26, pl.18, fig.4-7. Middle Aptian-Early Albian.

"insulofigurata" (Dodekova, 1975) Gocht, 1976, p.334. NOW and formerly *Meiourogonyaulax.*

**jurassica* Eisenack, 1935, p.175-177, pl.4, fig.5-10; text-fig.1-4; emend. Gocht, 1975b, p.355. Callovian.

var. *"ornata"* (Eisenack, 1935). NOW *Ctenidodinium ornatum.*

"pertusa" (Duxbury, 1977). NOW *Meiourogonyaulax.*

"pila" (Gitmez and Sarjeant, 1972) Gocht, 1976, p.334. NOW and formerly *Meiourogonyaulax.*

"pocockii" (Sarjeant, 1968) Davey, 1979d, p.217. NOW *Escharisphaeridia;* formerly *Chytroeisphaeridia.*

"?predae" (Beju, 1971) Gocht, 1976, p.334. NOW *Carpathodinium;* formerly *?Meiourogonyaulax.* Lentin and Williams, 1977b, p.177 questionably included this species in *Lithodinia.*

"psoros" (Davey and Verdier, 1974) Gocht, 1976, p.334. NOW and formerly *Meiourogonyaulax.*

"reticulata" (Dodekova, 1975) Gocht, 1976, p.334. NOW and formerly *Meiourogonyaulax.*

"rioultii" (Sarjeant, 1968) Gocht, 1976, p.334. NOW and formerly *Meiourogonyaulax.*

"sagena" (Duxbury, 1980). NOW *Meiourogonyaulax.*

serrulata Davies, 1983, p.26, pl.9, fig.1-6; text-fig.21. Toarcian-Early Bajocian.

"staffinensis" (Gitmez, 1970) Gocht, 1976, p.334. NOW and formerly *Meiourogonyaulax.* See also *Polygonifera.*

LITHODINIA **(cont'd)**

"stoveri" (Millioud, 1969) Gocht, 1976, p.334. NOW and formerly *Meiourogonyaulax*.

"strongylos" (Sarjeant, 1972) Gocht, 1976, p.334. NOW and formerly *Meiourogonyaulax*.

"superornata" (W. Wetzel, 1967) Fenton, 1981, p.253. The transfer of this species from *Meiourogonyaulax* to *Lithodinia* was rejected by Lentin and Willams, 1981, p.178 and the species was accordingly retained in *Meiourogonyaulax*.

"valensii" (Sarjeant, 1966b) Gocht, 1976, p.334. NOW and formerly *Meiourogonyaulax*.

"LITHOPERIDINIUM" Deflandre, 1933, p.272. *Jr syn.* of *Peridinites*. See Deflandre, 1945, card 806-809 and Norris and Sarjeant, 1965, p.38.

LITOSPHAERIDIUM Davey and Williams, 1966b, p.79-80; emend. Davey and Verdier, 1973, p.193; emend. Lucas-Clark, 1984, p.181-182.

arundum (Eisenack and Cookson, 1960, p.8, pl.3, fig.7-9) Davey, 1979b, p.557; emend. Lucas-Clark, 1984, p.188. Albian; formerly *Hystrichosphaeridium*. We do not agree with Below, 1982c, p.29 that this species is a *jr syn.* of *?Dapsilidinium fucosum*.

bacar Lucas-Clark, 1984, p.187, pl.3, fig.1-12. Albian-Cenomanian.

conispinum Davey and Verdier, 1973, p.193-194, pl.4, fig.4,6,8-9; emend. Lucas-Clark, 1984, p.187. Late Albian. See also *?Dapsilidinium* and *Polysphaeridium*.

"cooksoniae" (Ch. Singh, 1971) Yu Jingxian and Zhang Wangping, 1980. See *Florentinia cooksoniae*.

"?crassipes" (Reade, 1839) Davey and Williams, 1969, p.5. NOW *Hystrichokolpoma*. Originally *Xanthidium;* subsequently *Hystrichosphaeridium*. At the time of the transfer, Davey and Williams, *op.cit.* questionably included this species in *Litosphaeridium*. Stover and Evitt, 1978, p.62 considered this to be a "provisionally accepted species" of *Litosphaeridium*. According to Yun, 1981, p.27, the specimen figured in Reade, 1839, pl.9, fig.2 is *Pervosphaeridium truncigerum*. Lucas-Clark, 1984, p.184 stated that this species is "not accepted" in *Litosphaeridium*. She further stated that it is possibly referable to the genus *Hystrichokolpoma*.

fenestroconum (May, 1980, p.54-55, pl.3, fig.6-11) Lucas-Clark, 1984, p.190. Maastrichtian; formerly *Hystrichokolpoma*.

LITOSPHAERIDIUM **(cont'd)**

"*?flosculus*" (Deflandre, 1937b) Davey and Williams, 1969, p.5. NOW *?Florentinia.* At the time of the transfer, Davey and Williams, *op.cit.* questionably included this species in *Litosphaeridium*. N.I.A.

"*?inversibuccinum*" (Davey and Williams, 1966b). NOW *Paucisphaeridium*. Davey and Williams, *op.cit.* questionably included this species in *Litosphaeridium*.

"*?mamellatum*" De Coninck, 1977, p.42, pl.6, fig.8-13. Eocene. De Coninck, *op. cit.* questionably included this species in *Litosphaeridium*. Lucas-Clark, 1984, p.184 considered this species to be a *jr syn.* of the acritarch species *Cystidiopsis certis* Nagy, 1975.

oblongum Yu Jingxian and Zhang Wangping, 1980, p.112, pl.4, fig.7-8. Turonian-Santonian.

**siphonophorum* (Cookson and Eisenack, 1958, p.44, pl.11, fig.8-10) Davey and Williams, 1966b, p.80-82; emend. Lucas-Clark, 1984, p.186. Albian-Cenomanian; formerly *Hystrichosphaeridium*.

subsp. *glabrum* Lucas-Clark, 1984, p.186-187, pl.1, fig.1-11; pl.2, fig.2. Albian-Cenomanian.

"*?striatoconus*" (Deflandre and Cookson, 1955) Sarjeant, 1969, p.14. NOW *Conosphaeridium;* formerly *Hystrichosphaeridium*. At the time of the transfer, Sarjeant, *op.cit.* questionably included this species in *Litosphaeridium*. N.I.A.

"*?truncigerum*" (Deflandre, 1937b) Davey and Williams, 1969, p.6. NOW *Pervosphaeridium*. Originally *Hystrichosphaeridium*. At the time of the transfer, Davey and Williams, *op.cit.* questionably included this species in *Litosphaeridium*. See also *Cordosphaeridium*. Lentin and Williams, 1973, p.80 rejected the transfer of "*Hystrichosphaeridium truncigerum*" to *?Litosphaeridium* by Davey and Williams, 1969, since the species possesses a precingular archeopyle.

LOPHOCYSTA Manum, 1979, p.238.

**sulcolimbata* Manum, 1979, p.238,240-242, pl.1, fig.1-11; text-fig.1. Early Miocene.

LOPHODICTYOTIDIUM Pocock, 1972, p.109. Stover and Evitt, 1978, p.294 considered this to be an acritarch genus.

**sarjeantii* Pocock, 1972, p.109, pl.25, fig.5-6. Late Bajocian.

LUEHNDEA Morgenroth, 1970, p.346-347.

**spinosa* Morgenroth, 1970, p.347, pl.9, fig.1-4. Late Pliensbachian.

LUNATADINIUM Brideaux and McIntyre, 1973 p.396.

**dissolutum* Brideaux and McIntyre, 1973, p.396-397,400-401, pl.1, fig.1-13. Hauterivian-Middle Albian.

LUXADINIUM Brideaux and McIntyre, 1975, p.36.

?dabendorfense (Alberti, 1961, p.5, pl.3, fig.4) Bujak and Davies, 1983, p.163. Valanginian. Originally *Gymnodinium;* subsequently *Diconodinium.* At the time of the transfer, Bujak and Davies, *op.cit.* questionably included this species in *Luxadinium.*

**primulum* Brideaux and McIntyre, 1975, p.37-38, pl.12, fig.9-12; pl.13, fig.1-8. Middle Albian.

propatulum Brideaux and McIntyre, 1975, p.37 = *Scriniodinium eurypylum auct. non* Manum and Cookson 1964 in Brideaux, 1971, p.99, pl.29, fig.97-98 and in Ch. Singh, 1971, p.364, pl.62, fig.6-10. Albian.

M

MADURADINIUM Cookson and Eisenack, 1970a, p.150.

**pentagonum* Cookson and Eisenack, 1970a, p.150, pl.10, fig.13-17. Senonian.

subsp. *ovale* (Cookson and Eisenack, 1982) *stat. nov.*
1982 *Maduradinium pentagonum* var. *ovale* Cookson and Eisenack, p.34, pl.1, fig.15-16. Senonian.

"*spatiosum*" (Morgenroth, 1966b) Lentin and Williams, 1976, p.73. NOW *Lejeunecysta;* formerly *Lejeunia.*

MAGHREBINIA Below, 1981a, p.22.

chleuh Below, 1981a, p.22-23, pl.1, fig.5; pl.12, fig.5; text-fig.13. Vraconian-Cenomanian.

**perforata* (Clarke and Verdier, 1967, p.36, pl.6, fig.1-3; text-fig.15) Below, 1981a, p.23. Early Cenomanian. Originally *Dinopterygium;* subsequently *?Pterodinium.*

subsp. *mirabilis* Below, 1984, p.635-636, pl.6, fig.2. Late Albian-Early Cenomanian.

MANCODINIUM Morgenroth, 1970, p.352. Dörhöfer and Davies, 1980, p.23 considered this genus to be a *jr syn.* of *Dapcodinium* and transferred the type and single species of the genus, *M. semitabulatum,* to *Dapcodinium.* We herein reject the opinion of Dörhöfer and Davies, *op.cit.* and retain *Mancodinium* as a distinct and separate genus.

**semitabulatum* Morgenroth, 1970, p.352-353, pl.12, fig.3-6; pl.13, fig.1-4. Late Pliensbachian. See also *Dapcodinium.*

MANUMIELLA Bujak and Davies, 1983, p.160.

conorata (Stover, 1974, p.171-172, pl.1, fig.8a-b) Bujak and Davies, 1983, p.160. Early-Middle Paleocene. Originally *Deflandrea;* subsequently *Isabelia,* then *Isabelidinium,* then *Eurydinium.*

MANUMIELLA **(cont'd)**

?cretacea (Cookson, 1956, p.184-185, pl.1, fig.1-4 *non* fig.5, which is now *Manumiella delicata; non* fig.6-7, which are now *Nelsoniella aceras)* Bujak and Davies, 1983, p.161. Late Cretaceous. Originally *Deflandrea;* subsequently *Isabelia,* then *Isabelidinium.* At the time of the transfer, Bujak and Davies, *op.cit.* questionably included this species in *Manumiella.*

delicata (Baltes, 1969, p.34, pl.1, fig.7 *ex* Lentin and Williams, 1973, p.40) Bujak and Davies, 1983, p.161. Early Eocene. Originally *Deflandrea;* subsequently *Isabelia,* then *Isabelidinium.*

druggii (Stover, 1974, p.171, pl.1, fig.3a-b,4) Bujak and Davies, 1983, p.161. Early-Middle Paleocene. Originally *Deflandrea;* subsequently *Isabelia,* then *Isabelidinium.*

lata (Cookson and Eisenack, 1968, p.110; text-fig.1a-c) Bujak and Davies, 1983, p.161. ?Santonian-Early Campanian. Originally *Deflandrea;* subsequently *Isabelia,* then *Isabelidinium.*

raijae (Kjellström, 1973, p.20-22, fig.16) Bujak and Davies, 1983, p.161. Middle-Late Maastrichtian. Originally *Deflandrea;* subsequently *Alterbia* then *Eurydinium.*

**seelandica* (Lange, 1969, p.113-114, pl.2, fig.10; pl.3, fig.3) Bujak and Davies, 1983, p.162. Danian. Originally *Broomea;* subsequently *Isabelia,* then *Isabelidinium.*

MATHUROSPHAERA Varma and Dangwal, 1964, p.70.

**rajivii* Varma and Dangwal, 1964, p.70, pl.2, fig.11-12. Eocene-Oligocene. O.C.

MATURODINIUM Morgenroth, 1970, p.353-354. Dörhöfer and Davies, 1980, p.23 considered this genus to be a *jr syn.* of *Dapcodinium* and transferred the type and single species of the genus, *M. inornatum,* to *Dapcodinium.* We herein reject the opinion of Dörhöfer and Davies, *op.cit.* and retain *Maturodinium* as a distinct and separate genus.

**inornatum* Morgenroth, 1970, p.354-355, pl.13, fig.5-8. Late Pliensbachian. See also *Dapcodinium.*

MEIOUROGONYAULAX Sarjeant, 1966b, p.144. Gocht, 1975b, p.353 considered this genus to be a *jr syn.* of *Lithodinia* Eisenack; emend. Gocht. Stover and Evitt, 1978, p.62-63 differentiated *Meiourogonyaulax* from *Lithodinia* on the nature of the archeopyle. The contention by Fenton, 1981, p.250-251, that *Meiourogonyaulax* is a *jr syn.* of *Lithodinia* was rejected by Lentin and Williams, 1981, p.180, because of the apparent differences in archeopyle modes between the two genera.

MEIOUROGONYAULAX (cont'd)

?acanthosphaera (Sarjeant, 1961a, p.94-95, pl.13, fig.14; text-fig.4) Sarjeant, 1976c, p.12. Early Oxfordian. Sarjeant, *op.cit.* questionably included this species in *Meiourogonyaulax*. Originally *Gonyaulax;* subsequently *Acanthaulax*. See also *Lithodinia*. Stover and Evitt, 1978, p.63 considered this to be a "provisionally accepted species".

amlasis Below, 1981a, p.58, pl.6, fig.14-16. Hauterivian.

araneosa Muir and Sarjeant, 1978, p.197-198, pl.1, fig.1, text-fig.1. Middle Callovian. The transfer of this species to *Lithodinia* by Riley, 1979, p.221 was rejected by Lentin and Williams, 1981, p.181.

"borealis" (Sarjeant, 1980b). NOW *Lithodinia.*

bulloidea (Cookson and Eisenack, 1960b, p.247, pl.37, fig.11; text-fig.4) Sarjeant, 1969, p.14. Tithonian. Originally *Gonyaulax*. See also *Lithodinia.*

callomonii Sarjeant, 1972, p.31-33, pl.5, fig.5; text-fig.6. Late Bathonian-Early Callovian. See also *Lithodinia.*

?cantrellii Sarjeant, 1972, p.37-38, pl.4, fig.3; pl.6, fig.1-2; text-fig.8. Late Bathonian. Sarjeant, *op.cit.* questionably included this species in *Meiourogonyaulax*. See also *Lithodinia*. Stover and Evitt, 1978, p.63 considered this to be a "provisionally accepted species".

caytonensis (Sarjeant, 1959, p.330, pl.13, fig.1; text-fig.1) Sarjeant, 1969, p.14. Early Callovian; formerly *Gonyaulax*. See also *Lithodinia.*

?cristulata (Sarjeant, 1959, p.332, pl.13, fig.2; text-fig.2) Sarjeant, 1969, p.14. Early Callovian. Originally *Gonyaulax*. See also *Lithodinia*. At the time of the transfer, Sarjeant, *op.cit.* questionably included this species in *Meiourogonyaulax.*

decapitata (W. Wetzel, 1967, p.869, pl.16, fig.7a-b) Sarjeant, 1972, p.29-31; emend. Sarjeant, 1980b, p.121. Bajocian. Originally *Gonyaulax*. See also *Lithodinia*. Stover and Evitt, 1978, p.63 considered this to be a "problematical species". Fenton, 1981, p.253 considered this species, as *Lithodinia decapitata,* to be a *jr syn.* of *Meiourogonyaulax valensii,* as *Lithodinia valensii*. Sarjeant, 1982, p.127 maintained *Meiourogonyaulax decapitata* as a distinct and separate species.

deflandrei Sarjeant, 1968, p.228-229, pl.1, fig.20; pl.3, fig.13; text-fig.4. Late Callovian. See also *Lithodinia.*

MEIOUROGONYAULAX (cont'd)

"dicrypta" (Gitmez and Sarjeant, 1972). NOW *Canningia*. See also *Lithodinia*. Stover and Evitt, 1978, p.63 considered this to be a "problematical species" of *Meiourogonyaulax*. O.C.

ghermanii Beju, 1971, p.287-288, pl.4, fig.1-3; text-fig.4. Callovian-Oxfordian. See also *Lithodinia*.

insulofigurata Dodekova, 1975, p.21-22, pl.2, fig.4-5,7-8; text-fig.4. Late Bathonian. See also *Lithodinia*.

pertusa (Duxbury, 1977, p.41-43, pl.8, fig.5; text-fig.15) Below, 1981a, p.57. Berriasian-Hauterivian; formerly *Lithodinia*.

subsp. *heta* Below, 1981a, p.56-57, pl.3, fig.7-8; pl.11, fig.21; pl.14, fig,1-4; text-fig.59-60. Hauterivian.

subsp. *pertusa* (Duxbury, 1977, p.41-43, pl.8, fig.5; text-fig.15) Below, 1981a, p.57. Berriasian-Hauterivian; formerly *Lithodinia*. Yu Jingxian, 1982, p.258 was incorrect when he attributed this taxon to Below, 1981a, p.57. See I.C.B.N. Art. 26 for the ruling on autonyms.

pila Gitmez and Sarjeant, 1972, p.226-227, pl.4, fig.5; pl.7, fig.3; text-fig. 23. Middle-Late Kimmeridgian. See also *Lithodinia*.

"?predae" (Beju, 1971). NOW *Carpathodinium*. Beju, *op.cit.*, p.288 questionably included this species in *Meiourogonyaulax*. See also *Lithodinia*.

psora Davey and Verdier, 1974, p.634-636, pl.92, fig.8-9. Aptian. See also *Lithodinia*.

reticulata Dodekova, 1975, p.22-23, pl.2, fig.11-13; text-fig.4. Late Bathonian. See also *Lithodinia*.

rioultii Sarjeant, 1968, p.229; validation of *Meiourogonyaulax rioultii* Sarjeant, 1965, p.181, pl.1, fig.1; text-fig.1. Early Callovian. See also *Lithodinia*. Stover and Evitt, 1978, p.63 considered this to be a "problematical species".

sagena (Duxbury, 1980, p.127, pl.3, fig.6,9,12-13) Lentin and Williams, 1981, p.182. Barremian; formerly *Lithodinia*.

staffinensis Gitmez, 1970, p.276-278, pl.3, fig.1; text-fig.20a-b. Early Kimmeridgian. See also *Lithodinia*. The transfer of this species to *Polygonifera* by Davey, 1982b, p.31 is herein rejected because the nature of the archeopyle of that genus is not understood. The holotype of *M. staffinensis* is in very poor condition and the name should be restricted to the holotype.

MEIOUROGONYAULAX (cont'd)

stoveri Millioud, 1969, p.429, pl.3, fig.1-3. Hauterivian-Aptian. See also *Lithodinia*.

strongyla Sarjeant, 1972, p.35-37, pl.4, fig.7; text-fig.7. Late Bathonian-Early Callovian. See also *Lithodinia*. O.C.

superornata (W. Wetzel, 1967, p.869, pl.16, fig.8a-b) Sarjeant, 1969, p.15; emend. Sarjeant, 1980b, p.124-125. Bathonian. Originally *Gonyaulax;* subsequently *?Gonyaulacysta*. See also *Lithodinia*. The transfer of this species to *Lithodinia* by Fenton, 1981, p.253 was rejected by Lentin and Williams, 1981, p.178.

**valensii* Sarjeant, 1966b, p.145-146, pl.15, fig.7; text-fig.37. Bathonian. See *Lithodinia*. See also *Meiourogonyaulax decapicata* which is a *jr syn*. of this species.

MELITASPHAERIDIUM Harland and Hill, 1979, p.38-39.

aequabile Matsuoka, 1983b, p.114-115, pl.3, fig.7-9; pl.4, fig.3; text-fig.9. Late Miocene.

angustum Matsuoka, 1983b, p.115-116, pl.3, fig.6; pl.4, fig.1-2,4. Pliocene-Early Pleistocene.

asterium (Eaton, 1976, p.273, pl.11, fig.7-10) Bujak *et al.*, 1980, p.30. Late Eocene; formerly *Hystrichosphaeridium*.

**choanophorum* (Deflandre and Cookson, 1955, p.271-272; text-fig.23-29) Harland and Hill, 1979, p.39-40. Pliocene; formerly *Hystrichosphaeridium*. The species was emended by Harland and Hill, *op.cit.* at the time of the transfer.

pseudorecurvatum (Morgenroth, 1966a, p.30-31, pl.8, fig.5-6) Bujak *et al.*, 1980, p.30. Early Eocene. Originally *Hystrichosphaeridium;* subsequently *Operculodinium*. See also *Hystrichosphaeridium sheppeyense* which is a *jr syn*. of this species.

?simpulum Islam, 1983a, p.241, pl.3, fig.10-11. Early Eocene. Islam, *op.cit.* questionably included this species in *Melitasphaeridium*.

MEMBRANILARNACIA Eisenack, 1963a, p.99; emend. Williams and Downie, 1966c, p.219.

"?amalthei" (W. Wetzel, 1966). NOW *Endoscrinium*. Stover and Evitt, 1978, p.64 considered this to be a "provisionally accepted species" of *Membranilarnacia*.

MEMBRANILARNACIA (cont'd)

?australis (Pöthe de Baldis, 1966, p.225, pl.1, fig.h) Eisenack and Kjellström, 1971a, p.797. Early Tertiary; formerly *Membranilarnax*. Stover and Evitt, 1978, p.64 considered this to be a "provisionally accepted species".

"?characta" (Tasch, 1964, p.192, pl.1, fig.20) Eisenack and Kjellström, 1971a, p.799. Albian; formerly *Membranilarnax*. At the time of the transfer, Eisenack and Kjellström, *op.cit.* questionably included this species in *Membranilarnacia*. Pierce, 1976, p.27 considered this species to be a *jr syn.* of the acritarch *Schizosporis reticulata* Cookson and Dettmann.

"delicata" Kar, 1979, p.35, pl.4, fig.70-71. Oligocene. This species was shown to be a *jr syn.* of *Operculodinium centrocarpum* by Jain, 1980, p.140.

"densa" Cookson and Eisenack, 1974, p.71, pl.25, fig.19; pl.29, fig.19. Late Eocene. Stover and Evitt, 1978, p.64 considered this species to be a *jr syn.* of *?Valensiella clathroderma* (Deflandre and Cookson) Eisenack.

"diktyophora" Agelopoulos, 1967, p.49-50, pl.12, fig.3-4,6. Late Eocene. Eaton, 1976, p.277 considered this species to be a *jr syn.* of *"Cannosphaeropsis ursulae"* Morgenroth, 1966a, which is now included in *Eatonicysta*.

fibrosa Jiabo, 1978, p.91-92, pl.28, fig.1-12. Early Tertiary.

"?formosa" (Tasch, 1964, p.192, pl.1, fig.23) Eisenack and Kjellström, 1971a, p.801. Albian; formerly *Membranilarnax*. At the time of the transfer, Eisenack and Kjellström, *op.cit.* questionably included this species in *Membranilarnacia*. Pierce, 1976, p.27 considered this species to be a *jr syn.* of the acritarch *Schizosporis reticulata* Cookson and Dettmann.

"?gigantea" (Tasch, 1964, p.192, pl.2, fig.13) Eisenack and Kjellström, 1971a, p.803. Albian; formerly *Membranilarnax*. At the time of the transfer, Eisenack and Kjellström, *op.cit.* questionably included this species in *Membranilarnacia*. Pierce, 1976, p.27 considered this species to be a *jr syn.* of the acritarch *Schizosporis reticulata* Cookson and Dettmann.

glabra Agelopoulos, 1967, p.47-49, pl.12, fig.5; pl.13, fig.2,9; text-fig.6. Late Eocene.

**leptoderma* (Cookson and Eisenack, 1958, p.50, pl.10, fig.7,9) Eisenack, 1963a, p.101. Albian; formerly *Membranilarnax*.

liradiscoides (O. Wetzel, 1933b, p.52, pl.6, fig.3a-b) Downie and Sarjeant, 1965, p.129. Late Cretaceous; formerly *Membranilarnax*. Stover and Evitt, 1978, p.64 considered this to be a "problematical species".

?marina (Kufferath, 1950, p.34; text-fig.40) Downie and Sarjeant, 1965, p.129. Holocene; formerly *Membranilarnax*. At the time of the transfer, Downie and Sarjeant, *op.cit.* questionably included this species in *Membranilarnacia*.

MEMBRANILARNACIA (cont'd)

?minuta De Coninck, 1969, p.43, pl.12, fig.13-14. Eocene. Stover and Evitt, 1978, p.64 considered this to be a "provisionally accepted species".

?ovalis Cookson and Eisenack, 1974, p.72, pl.29, fig.21. Senonian. Stover and Evitt, 1978, p.64 considered this to be a "provisionally accepted species".

pellucida Yu Jingxian and Zhang Wangping, 1980, p.110, pl.3, fig.14-15. Cenomanian-Early Turonian.

polycladiata Cookson and Eisenack in Eisenack, 1963a, p.100. Holotype: Cookson and Eisenack, 1958, p.51, pl.10, fig.8 as *Membranilarnax* sp. Albian.

pterococcoides (O. Wetzel, 1933b, p.53, pl.6, fig.4) Eisenack, 1963a, p.102. Senonian; formerly *Membranilarnax*. Stover and Evitt, 1978, p.64 considered this to be a "problematical species".

subsp. *minuta* (Rozen, 1965, p.312-313, pl.2, fig.4-5; text-fig.23-24) Lentin and Williams, 1973, p.92. Late Eocene; formerly *Membranilarnacia pterococcoides* var. *minuta*.

"pterospermoides" (O. Wetzel, 1933b) Downie and Sarjeant, 1965, p.130. The transfer of this species from *Membranilarnax* to *Membranilarnacia* was rejected by Lentin and Williams, 1973, p.92.

"reticulata" Williams and Downie, 1966c, p.220-221, pl.24, fig.4-6; text-fig.59. Early Eocene. De Coninck, 1969, p.43 and Gocht, 1969, p.65 considered this species to be a *jr syn.* of *"Membranilarnacia ursulae"* (Morgenroth) De Coninck; the latter species is now included in the genus *Eatonicysta*.

"reticulovata" (Tasch, 1964, p.192, pl.2, fig.3) Eisenack and Kjellström, 1971a, p.811. Albian; formerly *Membranilarnax*. Pierce, 1976, p.27 considered this species to be a *jr syn.* of the acritarch *Schizosporis reticulata* Cookson and Dettmann.

scabra Jiabo, 1978, p.92, pl.27, fig.13. Early Tertiary.

?tenella Morgenroth, 1968, p.554-555, pl.48, fig.2-4. Danian. Stover and Evitt, 1978, p.64 considered this to be a "provisionally accepted species".

?tenera De Coninck, 1975, p.93-94, pl.17, fig.2-3. Ypresian. Stover and Evitt, 1978, p.64 considered this to be a "provisionally accepted species".

"ursulae" (Morgenroth, 1966a) De Coninck, 1969, p.43. NOW *Eatonicysta*.

wetzelii Cookson and Eisenack, 1982, p.46, pl.5, fig.3. Albian-Cenomanian. O.C.

MEMBRANILARNAX O. Wetzel, 1933b, p.51. Downie and Sarjeant, 1965, p.130 transferred the type of this genus, *M. pterospermoides,* to *?Membranilarnacia,* which in effect combines the two genera *Membranilarnacia* and *Membranilarnax.* According to the I.C.B.N. rules of priority, the first published name has priority and the genus *Membranilarnacia* becomes a *jr syn.* However, due to the uncertainty regarding the morphology of *M. pterospermoides,* Lentin and Williams, 1973, p.93 proposed that this species be retained in *Membranilarnax.* All other species with the exception of those listed below are now included in *Membranilarnacia.* Stover and Evitt, 1978, p.295 considered this to be an acritarch genus.

"amandopolitana" (Valensi, 1955b). NOW *?Valensiella.*

"angustivela" (Deflandre and Cookson, 1955). NOW *?Samlandia.*

"clathroderma" (Deflandre and Cookson, 1955). NOW *?Valensiella.*

"ovula" (Deflandre, 1947c). NOW *Valensiella.*

**pterospermoides* O. Wetzel, 1933b, p.52, pl.6, fig.1-2. Late Cretaceous.

MEMBRANOPHORIDIUM Gerlach, 1961, p.198; emend. Stover and Evitt, 1978, p.64-65.

**aspinatum* Gerlach, 1961, p.199-201, pl.29, fig.7-8; *ex* Gocht, 1969, p.61 (designation of lectotype: fig.7). Middle Oligocene. See also *Chiropteridium.*

attadalicum Cookson and Eisenack, 1982, p.46, pl.6, fig.21. Early Cenomanian.

"multispinatum" Gerlach, 1961, p.203-204, pl.29, fig.5. Late Oligocene-Middle Miocene. *Jr syn.* of *Chiropteridium dispersum* according to Brosius, 1963, p.48 and Gocht, 1969, p.63.

"partispinatum" (Gerlach, 1961) Brosius, 1963, p.48. NOW *Chiropteridium.*

?regulatum (Jiabo, 1978, p.78, pl.27, fig.1-2) Lentin and Williams, 1981, p.185. Early Tertiary; formerly *Cyclonephelium.* At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Membranophoridium.*

variatum (Jiabo, 1978, p.78-79, pl.27, fig.6-10) Lentin and Williams, 1981, p.185. Early Tertiary; formerly *Cyclonephelium.*

MEMBRANOSPHAERA Samoilovich, 1961, p.251 *ex* Norris and Sarjeant, 1965, p.40; emend. Drugg, 1967, p.29. The name *Membranosphaera* was originally used by Samoilovich, 1961, p.251 as the name of a "groupe" which is not recognized by the I.C.B.N. It was given generic status by Norris and Sarjeant, 1965, p.40. The type of the genus *M. maastrichtica* was at the same time given specific status. Other taxa of the original "groupe" *Membranosphaera* were overlooked. These taxa were given specific status in the genus *Membranosphaera* by Lentin and Williams, 1973, p.94. Stover and Evitt, 1978, p.263 considered this to be an acritarch genus. See also *Elytrocysta.*

MEMBRANOSPHAERA (cont'd)

bulluliniformis Maliavkina *ex* Lentin and Williams, 1973, p.94. (Original description, Maliavkina *in* Samoilovich and Mtchedlishvili, 1961, p.253-254, pl.84, fig.1a-b,2a-b,3-4). Late Jurassic-Late Cretaceous.

subsp. *bulluliniformis* Maliavkina *ex* Lentin and Williams, 1973, p.94. (Original description, Maliavkina *in* Samoilovich and Mtchedlishvili, 1961, p.253-254, pl.84, fig.1a-b,2a-b,3). Late Cretaceous.

subsp. *sphaerica* Maliavkina *ex* Lentin and Williams, 1973, p.94. (Original description, Maliavkina *in* Samoilovich and Mtchedlishvili, 1961, p.254-255, pl.84, fig.4). Late Jurassic.

"*coninckii*" (Burger, 1980a). NOW *Kallosphaeridium*.

"*granulata*" (Norvick, 1976). NOW *Kallosphaeridium*.

**maastrichtica* Samoilovich *ex* Norris and Sarjeant, 1965, p.40. (Original description, Samoilovich *in* Samoilovich and Mtchedlishvili, 1961, p.252, pl.83, fig.1a-d,2a-d). Late Cretaceous.

subsp. *pilata* Samoilovich *ex* Lentin and Williams, 1973, p.94. (Original description, Samoilovich *in* Samoilovich and Mtchedlishvili, 1961, p.253, pl.83, fig.3,4a-d). Late Cretaceous.

"*norvickii*" (Burger, 1980a). NOW *Kallosphaeridium*.

"*romaensis*" (Burger, 1980a). NOW *Kallosphaeridium*.

tuberculata Maliavkina *ex* Lentin and Williams, 1973, p.94. (Original description, Maliavkina *in* Samoilovich and Mtchedlishvili, 1961, p.255, pl.84, fig.7a-b,8). Late Jurassic.

MENDICODINIUM Morgenroth, 1970, p.347-348.

"*caperatum*" (Brideaux, 1977). NOW *Breedoxella*.

groenlandicum (Pocock and Sarjeant, 1972, p.352-354, pl.2, fig.1-9; text-fig.2) Davey, 1979c, p.64. Callovian; formerly *Thuledinium*. See also *Mendicodinium woodhamense* which is a *jr syn*. of this species.

**reticulatum* Morgenroth, 1970, p.348-349, pl.9, fig.5-6; pl.10, fig.1-4. Late Pliensbachian.

rugarum Piasecki, 1984, p.150-151, pl.4, fig.1-5,7-8; text-fig.5. Late Ryazanian-Early Valanginian.

"*woodhamense*" Drugg, 1978, p.70, pl.5, fig.10-11, pl.6, fig.1-2. Late Callovian. Riley and Fenton, 1982, p.200 considered this species to be a *jr syn*. of *Mendicodinium groenlandicum* (Pocock and Sarjeant) Davey.

MERISTAULAX Sarjeant, 1984a, p.160.

angulosa (Gitmez, 1970, p.252, pl.2, fig.4-5; text-fig.7a-b) Sarjeant and Gocht *in* Sarjeant, 1984a, p.160. Early Kimmeridgian. Originally *Gonyaulacysta;* subsequently *Acanthaulax.* Sarjeant, 1984a, p.160 rejected the contention of Fisher and Riley, 1980, p.321 that this species is a *jr syn.* of *Cribroperidinium granulatum* (Klement) Stover and Evitt.

**granulata* (Klement, 1960, p.39, pl.4, fig.10-13; text-fig.18-20) Sarjeant, 1984a, p.161, pl.3, fig.3-4; text-fig.3. Middle Oxfordian-Early Kimmeridgian. Originally *Gonyaulax;* subsequently *Gonyaulacysta,* then *Cribroperidinium.* See also *Rhynchodiniopsis.* At the time of the transfer, Sarjeant, *op.cit.*, p.160-163 emended the diagnosis. See also *Acanthaulax venusta, Cribroperidinium granuligerum* and *Meristaulax angulosa.*

MICRODINIUM Cookson and Eisenack, 1960a, p.6; emend. Sarjeant, 1966b, p.148-149; emend. Stover and Evitt, 1978, p.65-66.

?*alatum* (Conrad, 1941, p.5, pl.1, fig.C) Lentin and Williams 1976, p.109. Maastrichtian; formerly *Palaeoperidinium.* At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Microdinium.* Sarjeant, 1967b, p.24 recommended the transfer of *alatum* to *Microdinium.* The return of the species to the genus *Palaeoperidinium* by Stover and Evitt, 1978, p.66 was rejected by Lentin and Williams, 1981, p.187.

cassiculum Wilson, 1984c, p.552, fig.6-10. Maastrichtian.

?*crinitum* Davey, 1969a, p.137, pl.2, fig.7-8. Cenomanian. Davey, *op.cit.* questionably included this species in *Microdinium.*

"*deflandrei*" (Millioud, 1969). NOW *Druggidium.*

?*dentatum* Vozzhennikova, 1967, p.94-95, pl.38, fig.2a-e. Late Cretaceous. Stover and Evitt, 1978, p.66 considered this to be a "provisionally accepted species".

subsp. *dentatum* (Vozzhennikova, 1967, p.95, pl.38, fig.2a-e) Lentin and Williams, 1973, p.95. Late Cretaceous; formerly *Microdinium dentatum* forma *dentatum.*

subsp. *sphaericum* (Vozzhennikova, 1967, p.95-96, pl.36, fig.2a-b; pl.38, fig.1a-b) Lentin and Williams, 1973, p.95. Late Cretaceous; formerly *Microdinium dentatum* forma *sphaericum.*

distinctum Davey, 1969a, p.133-135, pl.2, fig.9-11; text-fig.13D-E,I. Cenomanian.

"*echinatum*" Clarke and Verdier, 1967, p.64, pl.1, fig.9-10; text-fig.26 Cenomanian. Clarke *et al.*, 1968, p.181 considered this species to be a *jr syn.* of *Microdinium setosum* Sarjeant, 1966b.

MICRODINIUM **(cont'd)**

?ellipsoideum (Deflandre, 1936b, p.178, pl.6, fig.5-7) Lentin and Williams, 1976, p.110. Senonian; formerly *Palaeoperidinium*. At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Microdinium*. Sarjeant, 1967b, p.250 recommended the transfer of *ellipsoideum* to *Microdinium*. The retention of the species in the genus *Palaeoperidinium* by Stover and Evitt, 1978, p.218 was rejected by Lentin and Williams, 1981, p.187.

glabrum Cookson and Eisenack, 1974, p.53, pl.20, fig.19. Senonian.

irregulare Clarke and Verdier, 1967, p.65-66, pl.7, fig.5-8; text-fig.27. Cenomanian-Santonian.

?kustanaicum Vozzhennikova, 1967, p.96, pl.37, fig.1a-b. ?Maastrichtian. Stover and Evitt, 1978, p.66 considered this to be a "provisionally accepted species".

opacum Brideaux, 1971, p.76-77, pl.21, fig.19-22; text-fig.7d-e. Middle-Late Albian.

**ornatum* Cookson and Eisenack, 1960a, p.6-7, pl.2, fig.3-8; text-fig.2-4. Albian-Turonian.

?ovatum Horowitz, 1975, p.24, pl.1, fig.3. Late Triassic. Stover and Evitt, 1978, p.66 considered this to be a "provisionally accepted species".

?punctulatum Vozzhennikova, 1967, p.96, pl.37, fig.7a-b. ?Maastrichtian. Stover and Evitt, 1978, p.66 considered this to be a "provisionally accepted species".

?reticulatum Vozzhennikova, 1967, p.96-97, pl.37, fig.2-5. Eocene. Stover and Evitt, 1978, p.66 considered this to be a "provisionally accepted species".

"robustum" Davey, 1969b, p.6, pl.1, fig.3; pl.3, fig.2. Stover and Evitt, 1978, p.30 considered this species to be a *jr syn.* of *Cladopyxidium saeptum*.

"saeptum" (Morgenroth, 1968). NOW *Cladopyxidium*.

setosum Sarjeant, 1966b, p.151, pl.16, fig.9-10; text-fig.39. Cenomanian. See also *Microdinium echinatum* which is a *jr syn.* of this species.

shangsicum He Cheng-quan, 1984b, p.160-161, pl.2, fig.1-6. Tertiary.

?singulare Vozzhennikova, 1967, p.97, pl.39, fig.2a-3. Eocene. O.C. Stover and Evitt, 1978, p.66 considered this to be a "provisionally accepted species".

smolenskiense (Vozzhennikova, 1967, p.93, pl.34, fig.1-6; pl.35, fig.6; pl.36, fig.4) Lentin and Williams, 1973, p.95. Late Cretaceous; formerly *Ceratocorys*. Stover and Evitt, 1978, p.66 considered this to be a "problematical species".

MICRODINIUM (cont'd)

spinosum Brideaux and McIntyre, 1975, p.23-24, pl.6, fig.3-5. Middle Albian.

?variospinum Davey, 1969a, p.135, pl.2, fig.5-6; text-fig.13G. Cenomanian. Stover and Evitt, 1978, p.66 considered this to be a "provisionally accepted species".

"veligerum" (Deflandre, 1937b) Davey, 1969a, p.136-137. NOW *Rhiptocorys*. Originally *Micrhystridium;* subsequently *Ceratocorys*. Stover and Evitt, 1978, p.66 considered this to be a "problematical species".

MICROSPHAERIDIUM Benedek, 1972, p.46-47. Benedek and Sarjeant, 1981, p.344-347, fig.10/4 (holotype) indicated after re-examination of the holotype, *M. ancistroides,* that the genus and species is based on the isolated operculum of a skolochorate dinoflagellate cyst, which cannot be positively identified with any other described species. Therefore, the name should be restricted to the holotype.

**ancistroides* Benedek, 1972, p.47, pl.12, fig.3; text-fig.21. Late Oligocene.

MIKROCYSTA Bjaerke, 1980, p.71.

**erugata* Bjaerke, 1980, p.71-72, pl.5, fig.10-11. Toarcian.

MIKROPITHON Agelopoulos, 1967, p.51. Stover and Evitt, 1978, p.295 considered this genus to be "not effectively published."

**amniphorum* Agelopoulos, 1967, p.51-52, pl.10, fig.6-8. Early-Late Eocene.

"MILLIOUDODINIUM" Stover and Evitt, 1978, p.173; emend. Sarjeant, 1982, p.39. Duxbury, 1980, p.122 stated that the holotype of the type of the genus *Millioudodinium, M. fetchamense,* possesses features (secondary rectilinear markings) which exclude it from the genus. He also proposed that *Cribroperidinium* was a *sr syn.* of *Millioudodinium.* Helenes, 1984, p.112, considered *Millioudodinium* to be a *jr syn.* of *Cribroperidinium,* thus agreeing with Duxbury, 1980. The present generic assignments of the individual species are given below.

"aichmetes" (Sarjeant, 1966b) Stover and Evitt, 1978, p.173. NOW *Cribroperidinium;* formerly *Gonyaulacysta.*

"ambiguum" (Deflandre, 1939) Stover and Evitt, 1978, p.173. NOW *Leptodinium.* Originally *Gonyaulax;* subsequently *Gonyaulacysta.*

"apione" (Cookson and Eisenack, 1958) Stover and Evitt, 1978, p.173. NOW *Cribroperidinium.* Originally *Gonyaulax;* subsequently *Gonyaulacysta.*

"bacculatum" (Baltes, 1971) Stover and Evitt, 1978, p.173. NOW and formerly *Leptodinium.* See also *Rhynchodiniopsis.*

"*MILLIOUDODINIUM*" (cont'd)

"*birkelundii*" (Fensome, 1979) Lentin and Williams, 1981, p.189. NOW *?Cribroperidinium;* formerly *Gonyaulacysta.*

"*?boreas*" (Davey, 1974) Stover and Evitt, 1978, p.174. NOW *Cribroperidinium;* formerly *Gonyaulacysta.* Stover and Evitt, 1978, p.174 considered this to be a "provisionally accepted species" of *Millioudodinium.*

"*cauda*" (Gitmez and Sarjeant, 1972) Stover and Evitt, 1978, p.173. NOW *Cribroperidinium;* formerly *Gonyaulacysta.* See also *Rhynchodiniopsis.* N.I.A.

"*confossum*" (Duxbury, 1977) Sarjeant, 1982, p.39. NOW *?Cribroperidinium;* formerly *Gonyaulacysta.*

"*?confusum*" (Vozzhennikova, 1967) Stover and Evitt, 1978, p.174. NOW *?Rhynchodiniopsis.* Originally *Gonyaulax;* subsequently *Gonyaulacysta.* Stover and Evitt, 1978, p.174 considered this to be a "provisionally accepted species" of *Millioudodinium.*

"*crispum*" (W. Wetzel, 1967) Stover and Evitt, 1978, p.173. NOW *Hystrichogonyaulax.* Originally *Gonyaulax;* subsequently *Gonyaulacysta.*

"*cristatum*" (Riley *in* Fisher and Riley, 1980) Fisher and Riley, 1982, p.53. NOW *Cribroperidinium;* formerly *Gonyaulacysta.* See also *Leptodinium volgense.*

"*deflandrei*" (Riley *in* Fisher and Riley, 1980) Fisher and Riley, 1982, p.53. NOW and formerly *Leptodinium.* Originally *Gonyaulacysta.* Pending re-examination of the holotype, we retain this species in *Leptodinium.*

"*?diutinum*" (Duxbury, 1977) Sarjeant, 1982, p.39. NOW and formerly *Gonyaulacysta.* Pending re-allocation of the Cretaceous taxa of *Gonyaulacysta* with the sigmoidal parasulcus, we prefer to retain this species in that genus.

"*ehrenbergii*" (Gitmez, 1970) Stover and Evitt, 1978, p.173. NOW *Cribroperidinium;* formerly *Gonyaulacysta.*

"*episomum*" (Sarjeant, 1966b) Stover and Evitt, 1978, p.173. NOW *Leptodinium;* formerly *Gonyaulacysta.* See also *Rhynchodiniopsis.*

"*?exsanguium*" (Duxbury, 1977) Sarjeant, 1982, p.39. NOW and formerly *Gonyaulacysta.* Pending re-allocation of the Cretaceous taxa of *Gonyaulacysta* with the sigmoidal parasulcus, we prefer to retain this species in that genus.

"**fetchamense*" (Sarjeant, 1966b) Stover and Evitt, 1978, p.173. NOW *Cribroperidinium;* formerly *Gonyaulacysta.*

***"MILLIOUDODINIUM"* (cont'd)**

"gigas" (Raynaud, 1978) Lentin and Williams, 1981, p.190. NOW *?Cribroperidinium;* formerly *Gonyaulacysta.*

"?giuseppei" (Morgenroth, 1966a) Stover and Evitt, 1978, p.174. NOW *Cribroperidinium.* Originally *Gonyaulax;* subsequently *Gonyaulacysta.* Stover and Evitt, 1978, p.174 considered this to be a "provisionally accepted species" of *Millioudodinium.*

subsp. *"major"* (Morgenroth, 1966a) Stover and Evitt, 1978, p.174. See *Cribroperidinium giuseppei.* Helenes, 1984, p.121 placed the subspecies in synonymy with the species. Originally *Gonyaulax giuseppei* subsp. *major;* subsequently *Gonyaulacysta giuseppei* subsp. *major.*

"globatum" (Gitmez and Sarjeant, 1972) Stover and Evitt, 1978, p.173. NOW *Cribroperidinium.* Originally *Gonyaulacysta;* subsequently *Rhynchodiniopsis.*

"?globosum" (Brideaux, 1971) Stover and Evitt, 1978, p.174. NOW *?Cribroperidinium;* formerly *Gonyaulacysta.* Stover and Evitt, *op.cit.*, p.174 considered this to be a "provisionally accepted species" of *Millioudodinium.*

"?gottisii" (Dupin, 1968) Stover and Evitt, 1978, p.174. NOW *Apteodinium;* formerly *Gonyaulacysta.* Stover and Evitt, 1978, p.174 considered this to be a "provisionally accepted species" of *Millioudodinium.*

"granomembranaceum" (Matsuoka, 1983b). NOW *?Cribroperidinium.*

"hadrum" (Sarjeant, 1966b) Stover and Evitt, 1978, p.173. NOW *?Leptodinium.* Originally *Gonyaulacysta;* subsequently *Millioudodinium,* then *Rhynchodiniopsis.*

"?italicum" (Corradini, 1973) Stover and Evitt, 1978, p.174. NOW *Hystrichogonyaulax;* formerly *Gonyaulacysta.* Stover and Evitt, 1978, p.174 considered this to be a "provisionally accepted species" of *Millioudodinium.*

"jubaris" (Davies, 1983). NOW *Cribroperidinium.* N.I.A.

"longicornis" (Downie, 1957) Sarjeant, 1982, p.39. NOW *?Cribroperidinium.* Originally *Gonyaulax;* subsequently *?Gonyaulacysta.*

"?mamilliferum" (Deflandre, 1939) Stover and Evitt, 1978, p.174. NOW *Leptodinium.* Originally *Gonyaulax;* subsequently *?Gonyaulacysta.* See also *?Rhynchodiniopsis.* Stover and Evitt, 1978, p.174 considered this to be a "provisionally accepted species" of *Millioudodinium.*

"*MILLIOUDODINIUM*" (cont'd)

"*?mecsekense*" (Nagy, 1969) Stover and Evitt, 1978, p.174. NOW *Apteodinium*. Originally *Palaeoperidinium;* subsequently *Gonyaulacysta*. Stover and Evitt, 1978, p.174 considered this to be a "provisionally accepted species" of *Millioudodinium*.

"*monacanthum*" (Deflandre, 1935) Stover and Evitt, 1978, p.174. NOW *Apteodinium*. Originally *Palaeoperidinium;* subsequently *Gonyaulacysta*.

"*nuciforme*" (Deflandre, 1938b) Sarjeant, 1982, p.39. Because of the apparent lack of tabulation in this species, we herein reject the above transfer and retain the species in *Apteodinium*.

"*obesum*" (Brideaux, 1971) Stover and Evitt, 1978, p.174. NOW *?Cribroperidinium;* formerly *Gonyaulacysta*. See also *Rhynchodiniopsis*.

"*obscurum*" (Lejeune-Carpentier, 1946) Sarjeant, 1982, p.39. NOW and formerly *?Gonyaulacysta*. Originally *Gonyaulax*. Pending re-allocation of the Cretaceous taxa of *Gonyaulacysta* with the sigmoidal parasulcus, we prefer to retain this species in that genus.

"*ordocavum*" (Duxbury, 1977) Sarjeant, 1982, p.39. NOW and formerly *Gonyaulacysta*. Pending re-allocation of the Cretaceous taxa of *Gonyaulacysta* with the sigmoidal parasulcus, we prefer to retain this species in that genus.

"*palla*" (Sarjeant, 1966b) Stover and Evitt, 1978, p.174. NOW *Cribroperidinium;* formerly *Gonyaulacysta*. See also *Rhynchodiniopsis*. N.I.A.

"*?pannonicum*" (Nagy, 1965) Stover and Evitt, 1978, p.174. NOW *?Cribroperidinium*. Originally *Gonyaulax;* subsequently *Gonyaulacysta*. Stover and Evitt, 1978, p.174 considered this to be a "provisionally accepted species" of *Millioudodinium*.

"*parorthoceras*" (Davey, 1968) Stover and Evitt, 1978, p.174. NOW *?Cribroperidinium;* formerly *Gonyaulacysta*.

"*pennatum*" (Riley *in* Fisher and Riley, 1980) Fisher and Riley, 1982, p.53. Pending re-examination of the holotype, we retain this species in the genus *Hystrichogonyaulax*.

"*punctatum*" (Baltes, 1971) Stover and Evitt, 1978, p.174. NOW and formerly *Leptodinium*.

"*saetigerum*" (McIntyre and Brideaux, 1980). NOW *?Cribroperidinium*.

"*sarjeantii*" (Vozzhennikova, 1967) Stover and Evitt, 1978, p.174. NOW *?Cribroperidinium*. Originally *Gonyaulax;* subsequently *Gonyaulacysta*. See also *Rhynchodiniopsis*.

"MILLIOUDODINIUM sarjeantii" **(cont'd)**

subsp. *"sphaericum"* (Vozzhennikova, 1967) Stover and Evitt, 1978, p.174. NOW *?Cribroperidinium sarjeantii* subsp. *sphaericum*. Originally *Gonyaulax sarjeanti* var. *sphaericum;* subsequently *Gonyaulacysta sarjeantii* subsp. *sphaericum*. See also *Rhynchodiniopsis sarjeantii* subsp. *sphaericum*.

"?scottii" (Cookson and Eisenack, 1958) Stover and Evitt, 1978, p.174. NOW *?Cribroperidinium*. Originally *Gonyaulax;* subsequently *Gonyaulacysta*. Stover and Evitt, 1978, p.174 considered this to be a "provisionally accepted species" of *Millioudodinium*.

"spinoreticulatum" (McIntyre and Brideaux, 1980). NOW *Apteodinium*.

"systremmatum" (Gitmez and Sarjeant, 1972) Sarjeant, 1982, p.39. NOW and formerly *Cribroperidinium*. Originally *Gonyaulacysta*.

"tenuitabulatum" (Gerlach, 1961) Stover and Evitt, 1978, p.174. NOW *Cribroperidinium*. Originally *Gonyaulax;* subsequently *Gonyaulacysta*. The transfer of this species to *Rhynchodiniopsis* by Sarjeant, 1984b, p.76 is herein rejected. At the time of the transfer to *Rhynchodiniopsis*, Sarjeant, *op.cit.* also emended the diagnosis, even though the holotype has been lost.

MIRIFICYSTA Yu Jingxian, 1982, p.237-238.

**lineata* Yu Jingxian, 1982, p.238, pl.1, fig.20; text-fig.3. Late Jurassic-Early Cretaceous.

MOESIODINIUM Antonescu, 1974, p.62.

**raileanui* Antonescu, 1974, p.62-63, pl.1, fig.1-16. Middle Jurassic.

MONTANAROCYSTA Corradini, 1973, p.183.

**aemiliana* Corradini, 1973, p.183-184, pl.30, fig.2,3a-b. Late Cretaceous-Paleocene.

MORKALLACYSTA Harris, 1974, p.163. Lentin and Williams, 1976, p.160 considered this genus to be a *jr syn.* of *Palaeoperidinium*. The type of the genus and single species *Morkallacysta pyramidalis*, was accordingly transferred to *Palaeoperidinium*. Stover and Evitt, 1978, p.113-114 retained *Morkallacysta* as a valid genus and rejected the transfer of the type species to *Palaeoperidinium*.

**pyramidalis* Harris, 1974, p.163, pl.1, fig.5-11. Paleocene; see also *Palaeoperidinium*.

MORKALLACYSTA (cont'd)

?tasmanica Cookson and Eisenack, 1982, p.37, pl.8, fig.9-10. Eocene. Cookson and Eisenack, *op.cit.* questionably included this species in *Morkallacysta.*

MUDERONGIA Cookson and Eisenack, 1958, p.40-41.

asymmetrica Brideaux, 1977, p.40, pl.15, fig.9-10, pl.16, fig.1. Aptian-Albian.

"crucis" Neale and Sarjeant, 1962, p.449-450, pl.20, fig.2,6; text-fig.6. Late Hauterivian. Morgan, 1980, p.28 considered this species to be a *jr syn.* of *Muderongia tetracantha* (Gocht) Alberti.

?digitata Duxbury, 1983, p.35-36, pl.3, fig.15; text-fig.15. Late Aptian. Duxbury, *op.cit.* questionably included this species in *Muderongia.*

extensiva Duxbury, 1977, p.54-55, pl.15, fig.10. Valanginian-Early Hauterivian.

imparilis Duxbury, 1980, p.127-129, pl.5, fig.2,4-5; text-fig.11. Barremian.

lata Yu Jingxian and Zhang Wangping, 1980, p.110, pl.3, fig.12-13. Late Cretaceous.

**mcwhaei* Cookson and Eisenack, 1958, p.41, pl.6, fig.1-5. Aptian.

"pannosa" (Duxbury, 1980). NOW *Australisphaera.*

pariata Duxbury, 1983, p.36-37, pl.2, fig.5,8; text-fig.16. Early Aptian-Early Albian.

pentaradiata Ch. Singh, 1983, p.127, pl.43, fig.5. Early Cenomanian.

perforata Alberti, 1961, p.13, pl.2, fig.8-9. Turonian.

simplex Alberti, 1961, p.12, pl.2, fig.1-2, 4-6; pl.12, fig.1-2. Valanginian-Early Barremian.

subsp. *microperforata* Davey, 1982b, p.30-31, pl.9, fig.4-6. Late Ryazanian-Early Valanginian.

staurota Sarjeant, 1966c, p.203-204, pl.21, fig.6-7; pl.23, fig.4; text-fig.53. Early Barremian.

testudinaria Burger, 1980b, p.274-275, fig.9B,10A-E. ?Hauterivian.

tetracantha (Gocht, 1957, p.168, pl.18, fig.7-9; text-fig.5) Alberti, 1961, p.14. Late Hauterivian; formerly *?Pseudoceratium.* See also *Muderongia crucis* which is a *jr syn.* of this species.

MUDERONGIA (cont'd)

tomaszowensis Alberti, 1961, p.12-13, pl.2, fig.12-13. Valanginian.

MUIRADINIUM Harland and Sarjeant, 1970, p.225.

**dorsispirale* (Churchill and Sarjeant, 1963, p.33, pl.1, fig.18; text-fig.2) Harland and Sarjeant, 1970, p.225. Holocene; formerly *Gymnodinium*.

MUIRIELLA Churchill and Sarjeant, 1963, p.36; emend. Harland and Sarjeant, 1970, p.226-227.

**plioplax* Churchill and Sarjeant, 1963, p.37-38, pl.1, fig.20-21; text-fig.4; emend. Harland and Sarjeant, 1970, p.227-228. Holocene.

MULTISPINULA Bradford, 1975, p.3067. Lentin and Williams, 1981, p.193 rejected the contention of Harland and Reid *in* Harland *et al.*, 1980, p.216, that this genus was illegitimate when created because it lacked a Latin diagnosis. As no living forms were observed, they agreed with Bradford, *op.cit.* who clearly stated that he considered cysts of unknown origin in unconsolidated sediments to be fossils.

minuta Harland and Reid *in* Harland *et al.*, 1980, p.216-217, fig.2M-O. Recent. Because this species was recovered from unconsolidated sediments in the Beaufort Sea does not necessarily imply that it is Recent. Sediments at the type locality are unconsolidated down to 8000' below the surface and reworking is extensive.

**quanta* Bradford, 1975, p.3067,3069, fig.5-7. Recent. Harland, 1981, p.68 and Kobayashi and Matsuoka, 1984, p.251 considered this species to represent the encysted stage of *Protoperidinium conicum* (Gran) Balech, 1974.

"MULTISPINULOSA" Harland, 1977b, *nom. nud.* No description. The name was erroneously used for *Multispinula* Bradford, 1975 by Harland, 1977b, p.105-106.

MURATODINIUM Drugg, 1970b, p.818.

**fimbriatum* (Cookson and Eisenack, 1967b, p.252, pl.40, fig.1-7) Drugg, 1970b, p.818-819. Paleocene; formerly *Kenleyia*.

N

"*NANNOCERATOPSIELLA*" Tasch, 1963, p.333. The type species of this "genus" is based on a mineral grain according to Stover and Evitt, 1978, p.265,295.

"**permiana*" Tasch, 1963, p.333, pl.1, fig.4-6. Early Permian. This "species" is based on a mineral grain according to Stover and Evitt, 1978, p.265.

"*wellingtoniana*" (Tasch, 1963, p.336, pl.1, fig.9) Lentin and Williams, 1976, p.45. Early Permian; formerly *?Deflandrea*. This "species" is based on a mineral grain according to Stover and Evitt, 1978, p.265.

NANNOCERATOPSIS Deflandre, 1938a, p.183; emend. Evitt, 1961b, p.306; emend. Piel and Evitt, 1980, p.102.

ambonis Drugg, 1978, p.70-71, pl.6, fig.3-7; emend. Riding, 1984a, p.75-76. Aalenian.

"*deflandrei*" Evitt, 1961b, p.308-312, pl.1, fig.1-14; pl.2, fig.1-29; text-fig. 5,9-17. Evitt, 1962, p.1129-1130 considered this species to be a *jr syn.* of *Nannoceratopsis gracilis* Alberti.

dictyambonis Riding, 1984a, p.78-79, pl.1, fig.1-6; text-fig.1B-C. Late Toarcian-Early Bajocian.

gracilis Alberti, 1961, p.30, pl.7, fig.16-17; emend. Evitt, 1962, p.1129-1130. Bajocian. See also *Nannoceratopsis deflandrei* which is a *jr syn.* of this species.

**pellucida* Deflandre, 1938a, p.183, pl.8, fig.8-12; emend. Evitt, 1961b, p.312. Oxfordian.

plegas Drugg, 1978, p.71, pl.6, fig.8-9, pl.7, fig.3. Aalenian.

senex van Helden, 1977, p.165, pl.33.1, fig.1-9; text-fig.33.4. ?Late Pliensbachian-Early Bajocian.

spiculata Stover, 1966, p.42-43, pl.8, fig.1a-5e. Bajocian-Bathonian.

triceras Drugg, 1978, p.71, pl.6, fig.10-12, pl.7, fig.1-2. Aalenian-Callovian. See also *Nannoceratopsis tricornuta* which is a *jr syn.* of this species.

"*tricornuta*" Wille and Gocht, 1979, p.241-242,244. fig.18-23. Toarcian. Wille and Gocht, *op.cit.*, p.256 considered this species to be a *jr syn.* of *Nannoceratopsis triceras*.

"NECROBROOMEA" Wiggins, 1975, p.111. *Jr syn.* of *Batioladinium* Brideaux. Wiggins, *op.cit.* designated *Necrobroomea longicornuta* (Alberti, 1961) as the type of the genus. All species, with the exception of *"Necrobroomea simplex"* are now included in *Batioladinium*. *"Necrobroomea simplex"* was retained in the genus *Broomea* by Lentin and Williams, 1976, p.144. The contention by Dörhöfer and Davies, 1980, p.36-37, that *Necrobroomea* is a *jr syn.* of *Imbatodinium* was accepted by Lentin and Williams, 1981, p.152. We herein reject this opinion for the reasons given under *Imbatodinium*.

"NELCHINOPSIS" Wiggins, 1972, p.299. *Jr syn.* of *Gonyaulacysta* according to Duxbury, 1977, p.37. See *Alaskadinium*.

*"*kostromiensis"* (Vozzhennikova, 1967) Wiggins, 1972, p.301-302. NOW and formerly *Gonyaulacysta*. Originally *Gonyaulax*. The transfer of this species to *Nelchinopsis* was rejected by Duxbury, 1977, p.37. See *Alaskadinium wigginsii*.

NELSONIELLA Cookson and Eisenack, 1960a, p.4.

**aceras* Cookson and Eisenack, 1960a, p.4, pl.1, fig.12-13. Santonian-Campanian.

oviformis Cookson and Eisenack, 1982, p.33, pl.3, fig.2. Senonian.

semireticulata Cookson and Eisenack, 1960a, p.4-5, pl.1, fig.15. Santonian-Campanian.

tuberculata Cookson and Eisenack, 1960a, p.4, pl.1, fig.14. Santonian-Campanian.

NEMATOSPHAEROPSIS Deflandre and Cookson, 1955, p.268; emend. Williams and Downie, 1966c, p.222.

"aquaeducta" (Piasecki, 1980). NOW *Impagidinium*. Edwards, 1984, p.586 considered this a "problematical species" in *Nematosphaeropsis*. The illustrations of Piasecki (pl.5, fig.1) obviously conform with the tabulation and morphology of *Impagidinium*. S. Manum (pers. comm.) drew our attention to comparative Miocene material from the Norwegian Sea when recommending this transfer.

"balcombiana" Deflandre and Cookson, 1955, p.268-269, pl.8, fig.5. Middle Miocene. This species, the original type of the genus, was considered to be a *jr syn.* of *Nematosphaeropsis labyrinthea* (Ostenfeld, 1903) Reid, 1974 by Reid, 1974, p.592 and Matsuoka, 1983a, p.10. *Nematosphaeropsis labyrinthea* therefore becomes the correct name for the nomenclatural type of the genus.

densiradiata (Cookson and Eisenack, 1962b, p.493, pl.4, fig.5-7) Stover and Evitt, 1978, p.176. Cenomanian; formerly *Cannosphaeropsis*.

***NEMATOSPHAEROPSIS* (cont'd)**

grandis Davey, 1975, p.153-154, pl.1, fig.9. Senonian (probably Campanian).

**labyrinthea* (Ostenfeld, 1903, p.578, fig.12) Reid, 1974, p.592. Recent; formerly assigned to the modern motile genus *Pterosperma* Pouchet. The original type of the genus *Nematosphaeropsis, N. balcombiana,* was considered to be a *jr syn.* of *N. labyrinthea* by Reid, 1974, p.592 and Matsuoka, 1983a, p.10; the latter therefore becomes the correct name for the nomenclatural type of the genus.

lemniscata Bujak, 1984, p.189-190, pl.3, fig.5-7. Late Oligocene-Early Pleistocene.

?philippotii (Deflandre, 1947a, p.1574; text-fig.2-3) De Coninck, 1969, p.29. Senonian; formerly *Cannosphaeropsis.* O.C. Stover and Evitt, 1978, p.176 considered this to be a "provisionally accepted species".

"pusulosa" (Morgenroth, 1966b) Stover and Evitt, 1978, p.176. NOW *Trabeculodinium;* formerly *Cannosphaeropsis.*

scala Duxbury, 1977, p.43, pl.9, fig.2. Valanginian-Hauterivian.

singularis Davey, 1979b, p.557, pl.5, fig.6,10,14. Aptian-Albian.

"velata" (Clarke and Verdier, 1967). NOW *?Spiniferites.*

NEODIACRODIUM Fedorova-Shakhmundes, 1976, p.94.

breviprocessatum Fedorova-Shakhmundes, 1976, p.97-98, pl.1, fig.5-6a. Late Barremian.

corniculatum Fedorova-Shakhmundes, 1976, p.96-97, pl.1, fig.4. Barremian.

hystrichoforme Fedorova-Shakhmundes, 1976, p.99, pl.1, fig.11. Late Barremian.

**longiprocessatum* Fedorova-Shakhmundes, 1976, p.94-95, pl.1, fig.7-8. Early Valanginian.

proprium Fedorova-Shakhmundes, 1976, p.98-99, pl.1, fig.9-10. Late Barremian.

timofeevii Fedorova-Shakhmundes, 1976, p.95-96, pl.1, fig.2-3. Early Albian.

NETRELYTRON Sarjeant, 1961a, p.113; emend. Sarjeant, 1966c, p.199. Wiggins, 1975, p.110 and Stover and Evitt, 1978, p.110 considered this genus to be a *jr syn.* of *Kalyptea* Cookson and Eisenack; emend. Wiggins. Wiggins, *op. cit.* accordingly transferred the type of the genus, *Netrelytron stegastum,* and *N. trinetron* to *Kalyptea.* Wiggins considered the remaining species *Netrelytron parum* Gitmez, to be a *jr syn.* of *"Kalyptea trinetron"* (Sarjeant) Gitmez. Sarjeant, 1976c, p.15-17 retained *Netrelytron* and the species therein.

NETRELYTRON (cont'd)

"jurassicum" (Alberti, 1961). Invalidly transferred from *Kalyptea* by Sarjeant, 1966c, p.201.

parum Gitmez, 1970, p.314-315, pl.5, fig.4; pl.9, fig.4. Early Kimmeridgian. Wiggins, 1975, p.110 considered this species to be a *jr syn.* of *"Kalyptea trinetron"* (Sarjeant) Wiggins. Sarjeant, 1976c, p.16-17, however, refuted Wiggins's conclusions. Stover and Evitt, 1978, p.110 agreed with Wiggins.

**stegastum* Sarjeant, 1961a, p.114-115, pl.15, fig.15; text-fig.14. Early Oxfordian. Wiggins, 1975, p.110 transferred this species to *Kalyptea.* Sarjeant, 1976c, p.16, however, retained *Netrelytron* and the species therein, including *N. stegastum.* Stover and Evitt, 1978, p.110 agreed with Wiggins.

trinetron Sarjeant, 1966c, p.199-200, pl.22, fig.3; text-fig.51. Middle Barremian. Wiggins, 1975, p.110 transferred this species to *Kalyptea.* Sarjeant, 1976c, p.16-17, however, retained *Netrelytron* and the species therein, including *N. trinetron.* Stover and Evitt, 1978, p.110 agreed with Wiggins.

NEXOSISPINUM Davey, 1979b, p.557-558.

**hesperum* Davey, 1979b, p.558, pl.6, fig.1-5. Aptian-Albian.

vetusculum (Davey, 1974, p.45, pl.1, fig.1-2) Davey, 1979b, p.558. Barremian. Originally *Adnatosphaeridium;* subsequently *Systematophora.*

NORICYSTA Bujak and Fisher, 1976, p.58; emend. Dörhöfer and Davies, 1980, p.23-24.

**fimbriata* Bujak and Fisher, 1976, p.60,62, pl.9, fig.1-5; text-fig.5A-B; emend. Dörhöfer and Davies, 1980, p.24. Norian.

pannucea Bujak and Fisher, 1976, p.62, pl.9, fig.6-10; text-fig.5D. Norian.

varivallata Bujak and Fisher, 1976, p.62, pl.9, fig.16-17; text-fig.5C. Norian.

NUMMUS Morgan, 1975, p.163. Stover and Evitt, 1978, p.295 considered this to be an acritarch genus.

**monoculatus* Morgan, 1975, p.163, pl.3, fig.1a-d,4a-c. Late Neocomian-Aptian.

similis (Cookson and Eisenack, 1960b, p.254, pl.38, fig.14) Burger, 1980b, p.275. Tithonian; formerly *Leiosphaeridia.*

O

OCCISUCYSTA Gitmez, 1970, p.267. See also *Diacanthum*.

aculeata (Klement, 1960, p.42, pl.5, fig.6-9; text-fig.21) Below, 1981a, p.60. Early Kimmeridgian. Originally *Gonyaulax;* subsequently *Gonyaulacysta*, then *Acanthaulax*. Lentin and Williams, 1981, p.198 rejected this transfer and retained the species in *Acanthaulax*. Since the holotype has a 2P archeopyle (Stover, pers. comm.), however, we herein accept the transfer of Below, *op.cit.*

**balia* Gitmez, 1970, p.267-268, pl.5, fig.1-2; text-fig.16. Early Kimmeridgian. O.C.

brixii Below, 1982a, p.29-30,32, pl.2, fig.4-13; pl.3, fig.10-17,21; text-fig.5. Early Valanginian.

"*cornuta*" (Davey, 1974) Below, 1981a, p.60. Lentin and Williams, 1981, p.198 rejected this transfer and retained the species in *Cribroperidinium*.

coummia Below, 1981a, p.61, pl.8, fig.6-7; pl.13, fig.10-11. Albian.

crestata Jain, 1977, p.175, pl.5, fig.63-65. Early Albian.

?*echinata* Duxbury, 1983, p.51, pl.4, fig.12-13. Aptian. Duxbury, *op.cit.* questionably included this species in *Occisucysta*.

evittii (Dodekova, 1969, p.14, pl.1, fig.1-2) Gitmez, 1970, p.269. Tithonian; formerly *Gonyaulacysta*. O.C.

hinzii Below, 1984, p.636, pl.6, fig.7-8; text-fig.6. Middle to Late Aptian.

"*hollisteri*" (Habib, 1972) Below, 1981a, p.60. Lentin and Williams, 1981, p.198 rejected this transfer and retained the species in *Diacanthum*.

mazaganensis Below, 1984, p.636-637, pl.6, fig.9; pl.7, fig.1; text-fig.7. Late Albian.

monoheuriska Gitmez and Sarjeant, 1972, p.221-223, pl.7, fig.10-11; text-fig.21. Early Kimmeridgian. O.C.

"*paucispina*" (Eisenack and Cookson, 1960) Below, 1981a, p.60. Lentin and Williams, 1981, p.198 rejected this transfer and retained the species in *Trichodinium*.

sousensis Below, 1981a, p.61-62, pl.8, fig.1-2. Aptian.

OCCISUCYSTA **(cont'd)**

"?speetonensis" (Davey, 1974) Below, 1981a, p.60. Lentin and Williams, 1981, p.198 rejected this transfer and retained the species in *Trichodinium*. at the time of the transfer, Below, *op.cit.* questionably included this species in *Occisucysta*.

tentoria Duxbury, 1977, p.44-45, pl.3, fig.8-9; text-fig.16. Berriasian-Barremian.

"tenuiceras" (Eisenack, 1958) Below, 1981a, p.63. Lentin and Williams, 1981, p.198 rejected this transfer and retained the species in *Diacanthum*.

thulia Davies, 1983, p.19-20, pl.5, fig.1-8,10-12; text-fig.14. Middle Callovian-Oxfordian.

victorii Pöthe de Baldes and Ramos, 1983, p.444, pl.3, fig.6,8. Early Aptian.

OCHETODINIUM Damassa, 1979a, p.830,833.

**romanum* Damassa, 1979a, p.833-834, pl.6, fig.1-2. Early-Middle Eocene.

ODONTOCHITINA Deflandre, 1935, p.234; emend. Davey, 1970, p.354.

annulata Yu Jingxian and Zhang Wangping, 1980, p.110, pl.3, fig.10-11. Late Cretaceous.

athabaskensis Pocock, 1962, p.78, pl.14, fig.209-210. Barremian.

"blastema" Davey, 1970, p.356, pl.5, fig.4-5. Davey and Verdier, 1971, p.27 considered this species to be a *jr syn.* of *Xenascus ceratioides* (Deflandre) Lentin and Williams.

costata Alberti, 1961, p.31, pl.6, fig.10-13; emend. Clarke and Verdier, 1967, p.58-59. Cenomanian-Turonian. See also *Odontochitina striatoperforata* which is a *jr syn.* of this species.

cribropoda Deflandre and Cookson, 1955, p.292, pl.3, fig.7-11; text-fig.58. Senonian. See also *Odontochitina subbaramana* which is a *jr syn.* of this species.

nuda (Gocht, 1957, p.168, pl.18, fig.3-4,6) Dörhöfer and Davies, 1980, p.39. Late Hauterivian; formerly *?Pseudoceratium*.

**operculata* (O. Wetzel, 1933a, p.170, pl.2, fig.21-22; text-fig.3) Deflandre and Cookson, 1955, p.291-292. Senonian; formerly *Ceratium*, subgenus *Euceratium*. See also *Odontochitina silicorum* which is a *jr syn.* of this species.

porifera Cookson, 1956, p.188, pl.1, fig.17. Senonian.

ODONTOCHITINA (cont'd)

"silicorum" Deflandre, 1935, p.234, pl.9, fig.8-10. Late Cretaceous. Deflandre and Cookson, 1955, p.292 considered this species to be a *jr syn.* of *Odontochitina operculata* (O. Wetzel) Deflandre and Cookson. N.I.A.

singhii Morgan, 1980, p.29-30, pl.20, fig.12-15. Early-Late Albian.

spinosa Wilson, 1984c, p.554,556, fig.22-26. Maastrichtian.

"striatoperforata" Cookson and Eisenack, 1962b, p.490, pl.3, fig.14-19. Albian-Cenomanian. Clarke and Verdier, 1967, p.58 considered this species to be a *jr syn.* of *Odontochitina costata* Alberti.

"subbaramana" Jain and Taugourdeau-Lantz, 1973, p.64-65, pl.4, fig.3. Early Cretaceous. *Jr syn.* of *Odontochitina cribropoda* according to Jain, 1977, p.186.

ODONTOCHITINOPSIS Eisenack, 1961, p.298-299,308.

incerta (Deflandre-Rigaud, 1954, p.59; text-fig.3) Eisenack, 1964, p.563. Late Cretaceous; formerly *Ceratocystidiopsis.* According to Article 33, para 4 of the I.C.B.N., the transfer of *Ceratocystidiopis incerta* to *Odontochitinopsis* by Eisenack, 1961, p.299 is invalid. Lentin and Williams, 1981, p.199 rejected the retention of the species in *Ceratocystidiopsis* as proposed by Stover and Evitt, 1978, p.234.

**molesta* (Deflandre, 1937b, p.90, pl.17, fig.1-2) Eisenack, 1961, p.299. Senonian; formerly *Ceratocystidiopsis.*

OLIGOSPHAERIDIUM Davey and Williams, 1966b, p.70-71; emend. Davey, 1982b, p.13.

abaculum Davey, 1979a, p.428,430,432-433, pl.48, fig.1-6; pl.49, fig.1-7, pl.50, fig.1,4,10-11; text-fig.1-2. Barremian.

albertense (Pocock, 1962, p.82, pl.15, fig.226-227) Davey and Williams, 1969, p.5. Barremian; formerly *Hystrichosphaeridium.*

"anthophorum" (Cookson and Eisenack, 1958) Davey, 1969a, p.147. NOW *Stiphrosphaeridium;* formerly *Hystrichosphaeridium.* The transfer of this species to *Polystephanephorus* by Davey, 1979c, p.65 was rejected by Lentin and Williams, 1981, p.200. These authors also rejected transfer of this species to *Hystrichosphaerina* by Duxbury, 1980, p.126.

?asterigerum (Gocht, 1959, p.67, pl.3, fig.1; pl.7, fig.1-4) Davey and Williams, 1969, p.5. Hauterivian; formerly *Hystrichosphaeridium.* At the time of the transfer, Davey and Williams, *op.cit.* questionably included this species in *Oligosphaeridium.* Stover and Evitt, 1978, p.68 considered this to be a "provisionally accepted species". See also *Oligosphaeridium macrotubulum* and *O. vasiformum* which are *jr synonyms* of this species.

***OLIGOSPHAERIDIUM* (cont'd)**

buciniferum Corradini, 1973, p.142-143, pl.21, fig.2a-b; text-fig.5. Senonian.

"cephalum" Sah *et al.*, 1970, p.147, pl.2, fig.22-23. Late Cretaceous. According to Lejeune-Carpentier and Sarjeant, 1981, p.9, this species is a *jr syn.* of *Oligosphaeridium complex* (White) Davey and Williams. Jain, 1981, p.52 also considered this species to be a *jr syn.* of *Oligosphaeridium complex.*

"?coelenteratum" (Tasch, 1964, p.195, pl.2, fig.11) Davey and Williams, 1969, p.5. Albian; formerly *Hystrichosphaeridium.* At the time of the transfer, Davey and Williams, *op.cit.* questionably included this species in *Oligosphaeridium.* Stover and Evitt, 1978, p.69 considered this species to be a *jr syn.* of *Oligosphaeridium irregulare.*

**complex* (White, 1842, p.39, pl.4, fig.11) Davey and Williams, 1966b, p.71-74, pl.7, fig.1 (neotype). Senonian. Originally *Xanthidium tubiferum complex;* subsequently *Hystrichosphaeridium.* See also *Hystrichosphaeridium elegantulum* and *Oligosphaeridium cephalum* which are *jr synonyms* of this species.

subsp. *brevispinum* Jain, 1977, p.182, pl.1, fig.4. Albian.

"diastema" Singh, 1971, p.337, pl.55, fig.4-5; pl.56, fig.1-2. Harker and Sarjeant, 1975, p.226 and Brideaux and McIntyre, 1975, p.29 considered this species to be a *jr syn.* of *Oligosphaeridium totum* Brideaux.

"dictyophorum" (Cookson and Eisenack, 1958) Davey and Williams, 1969, p.5. NOW *Stiphrosphaeridium;* formerly *Hystrichosphaeridium.*

"?dictyostilum" (Menendez, 1965, p.11, pl.2, fig.6; pl.3, fig.18-22) Eisenack and Kjellström, 1971a, p.845. NOW *Areosphaeridium.* Eaton, 1971, p.359 considered this species to be a *jr syn.* of *Areosphaeridium diktyoplokus* (Klumpp) Eaton. Sarjeant, 1981, p.115-116 did not agree with Eaton. At the time of the transfer, Eisenack and Kjellström, 1971a, p.845 questionably included this species in *Oligosphaeridium.*

diluculum Davey, 1982b, p.14-15, pl.2, fig.1-5. Ryazanian.

"?dispare" (Tasch, 1964, p.195, pl.2, fig.8) Davey and Williams, 1969, p.5. Albian; formerly *Hystrichosphaeridium.* At the time of the transfer, Davey and Williams, *op.cit.* questionably included this species in *Oligosphaeridium.* Stover and Evitt, 1978, p.69 considered this species to be a *jr syn.* of *Oligosphaeridium irregulare* (Pocock) Davey and Williams.

dividuum Williams, 1978, p.797, pl.5, fig.8. Valanginian-Barremian.

djenn Below, 1982c, p.22, pl.2, fig.1-3; text-fig.5i-1. Barremian.

***OLIGOSPHAERIDIUM* (cont'd)**

fenestratum Duxbury, 1980, p.130-131, pl.9, fig.8-9. Barremian.

heilongjiangense Yu Jingxian, 1982, p.248-249, pl.5, fig.1,4. Valanginian-Hauterivian.

intermedium Corradini, 1973, p.143-144, pl.21, fig.7; text-fig.6. Late Cretaceous-?Paleocene.

irregulare (Pocock, 1962, p.82, pl.15, fig.228-229 *non* Merrill, 1895) Davey and Williams, 1969, p.5. Barremian; formerly *Hystrichosphaeridium*. See also *Oligosphaeridium coelenteratum, O. dispare* and *O. reniforme* which are *jr synonyms* of this species. See also *Hystrichosphaeridium speciale.*

"?macrotubulum" (Neale and Sarjeant, 1962, p.452, pl.20, fig.7; text-fig.8a) Davey and Williams, 1966b, p.75. Hauterivian; formerly *Hystrichosphaeridium*. Stover and Evitt, 1978, p.68-69 considered this to be a "provisionally accepted species". *Syn.* of *Oligosphaeridium vasiformum* according to McIntyre and Brideaux, 1980, p.21. Also a *jr syn.*, by implication, of *Oligosphaeridium asterigerum;* see Duxbury, 1977, p.45.

membranaceum Jiabo, 1978, p.71-72, pl.26, fig.12. Early Tertiary.

minor Jiabo, 1978, p.72, pl.26, fig.5-6. Early Tertiary.

"nannum" (Davey, 1974). NOW *Discorsia.*

"?paradoxum" (Brosius, 1963) Davey and Williams, 1969, p.5. NOW *Bipolaribucina*. Originally *Hystrichosphaeridium*. See also *Tanyosphaeridium* and *Distatodinium*. At the time of the transfer, Davey and Williams, *op.cit.* questionably included this species in *Oligosphaeridium.*

perforatum (Gocht, 1959, p.68, pl.3, fig.7; pl.7, fig.13-16) Davey and Williams, 1969, p.5. Hauterivian-Barremian; formerly *Hystrichosphaeridium.*

subsp. *colum* Duxbury, 1983, p.53, pl.8, fig.9; text-fig.24. Late Aptian-Early Albian.

subsp. *perforatum* (Gocht, 1959, p.68, pl.3, fig.7; pl.7, fig.13-16) Davey and Williams, 1969, p.5. Hauterivian-Barremian. Duxbury, 1983, p.52 did not erect the taxon *Oligosphaeridium perforatum* subsp. *perforatum* since the autonym existed when Gocht, 1959, p.68 erected the species.

"perforatum" (Jain, 1977). *Jr hom.* of *Oligosphaeridium perforatum* (Gocht, 1959) Davey and Williams, 1969. NOW *Oligosphaeridium porosum.*

poculum Jain, 1977, p.181, pl.1, fig.1-3. Early Albian.

***OLIGOSPHAERIDIUM* (cont'd)**

porosum Lentin and Williams, 1981, p.201 *nom. subst. pro Oligosphaeridium perforatum* Jain, 1977, p.181, pl.1, fig.5-7 *non O. perforatum* (Gocht, 1959, p.68, pl.3, fig.7; pl.7, fig.13-16) Davey and Williams, 1969, p.5. Early Albian.

prolixispinosum Davey and Williams, 1966b, p.76-77, pl.8, fig.2-3. Cenomanian. The transfer of this species to *Tanyosphaeridium* by Duxbury, 1980, p.132 was rejected by Lentin and Williams, 1981, p.201, because of the number and nature of the processes.

pulcherrimum (Deflandre and Cookson, 1955, p.270, pl.1, fig.8; text-fig. 21-22) Davey and Williams, 1966b, p.75-76. Albian; formerly *Hystrichosphaeridium*.

"reniforme" (Tasch, 1964, p.193, pl.2, fig.6) Davey, 1969a, p.148. Albian; formerly *Hystrichosphaeridium*. Stover and Evitt, 1978, p.69 considered this species to be a *jr syn.* of *Oligosphaeridium irregulare*.

reticulatum Davey and Williams, 1966b, p.74, pl.7, fig.10. Cenomanian.

suibinense Yu Jingxian, 1982, p.249, pl.5, fig.7. Valanginian-Hauterivian.

tenuiprocessum Ch. Singh, 1983, p.123-124, pl.42, fig.1-4. Latest Albian-Early Cenomanian.

totum Brideaux, 1971, p.88-89, pl.25, fig.53-55,57. Late Albian. See also *Oligosphaeridium diastema* which is a *jr syn.* of this species.

subsp. *minor* (Brideaux, 1971, p.88-89, pl.25, fig.54,57) Lentin and Williams, 1973, p.100. Late Albian; formerly *Oligosphaeridium totum* var. *minor*.

subsp. *totum* (Brideaux, 1971, p.88, pl.25, fig.53,55) Lentin and Williams, 1973, p.100. Late Albian; formerly *Oligosphaeridium totum* var. *totum*.

trabeculosum Ch. Singh, 1983, p.122-123, pl.41, fig.11. Early Cenomanian.

"vasiformum" (Neale and Sarjeant, 1962, p.452, pl.20, fig.1; text-fig.8b) Davey and Williams, 1966b, p.74-75. Middle Hauterivian-Early Barremian; formerly *Hystrichosphaeridium*. *Jr syn.* of *?Oligosphaeridium asterigerum* according to Duxbury, 1977, p.45.

verrucosum Davey, 1979b, p.558, pl.5, fig.1-3. Aptian.

OLLULA Goczan, 1962, p.194,200. Stover and Evitt, 1978, p.295 stated that this is not a dinoflagellate.

**goczanii* Loeblich and Loeblich, 1966, p.442, *nom. subst. pro tautonym O. ollula* Goczan, 1962, p.195,201, pl.3, fig.11-16. See Loeblich and Loeblich, 1971, p.312. Cretaceous.

OMANODINIUM Bradford, 1975, p.3070. Lentin and Williams, 1981, p.202 rejected the contention of Harland and Reid *in* Harland *et al.*, 1980, p.223 that this genus and the two included species, *O. alticinctum* and *O. tholus*, were illegitimate because they lacked Latin diagnoses. As no living forms were observed, Lentin and Williams, 1981 agreed with Bradford, 1975 who clearly stated that he considered cysts of unknown origin in unconsolidated sediments to be fossils. Bradford and Wall, 1984, p.49 implied that this genus is a *jr syn.* of *Selenopemphix* Benedek.

**alticinctum* Bradford, 1975, p.3070,3072, fig.23-28. Recent. Also see the discussion under the genus. Matsuoka, 1984b, p.2 considered this species to represent the encysted stage of *Protoperidinium subinerme* (Paulsen) Loeblich III.

tholus Bradford, 1975, p.3072,3074, fig.17-22. Recent. Also see discussion under genus. Bradford and Wall, 1984, p.49 included this species in the modern genus *Protoperidinium*. As the species is considered to be a fossil, the combination is rejected herein and the fossil name remained.

OMATIA Cookson and Eisenack, 1958, p.60; emend. Wiggins, 1969, p.150. See also *Herendeenia* which is a *jr syn.* of this genus.

alaskaensis Stover and Evitt, 1978, p.178; Appendix G, p.280 = *Herendeenia pisciformis* of Wiggins, 1969, p.146,148, pl.1, fig.1-7; holotype: pl.1, fig.1-3, not *Omatia pisciformis* of Cookson and Eisenack, 1958, p.61, pl.8, fig.6. Neocomian, probably Late Hauterivian-Barremian.

"butticula" (Wiggins, 1969). NOW *Boreocysta.*

**montgomeryi* Cookson and Eisenack, 1958, p.60, pl.8, fig.7-9. Late Jurassic.

pisciformis Cookson and Eisenack, 1958, p.61, pl.8, fig.6. Late Jurassic. The transfer of this species to *Herendeenia* by Wiggins, 1969, p.146-148 was rejected by Stover and Evitt, 1978, p.280-281. See also *Omatia alaskaensis.*

OMATIDIUM Courtinat *in* Courtinat and Gaillard, 1980, p.40.

**amphiacanthum* (Cookson and Eisenack, 1958, p.37, pl.5, fig.9) Courtinat *in* Courtinat and Gaillard, 1980, p.40. Late Jurassic or Neocomian.

"OODNADATTIA" Eisenack and Cookson, 1960, p.6. *Jr syn.* of *Dinopterygium:* see Norris and Sarjeant, 1965, p.44. Clark and Verdier, 1967, p.36 considered the type of the genus, *O. tuberculata,* to be a *jr syn.* of *Dinopterygium,* but retained *Dinopterygium tuberculatum* as a distinct and separate species. Lentin and Williams, 1981, p.203 rejected the re-instatement of the genus *Oodnadattia* by Below, 1981a, p.64, who stated that this genus has an apical archeopyle. Morgan, 1980, p.30 in a restudy of *"Oodnadattia tuberculata"* stated that "The broad paracingular and parasutural crests, and the epicystal archeopyle make this species distinctive". He further suggested that published information and illustrations suggested that

***"OODNADATTIA"* (cont'd)**

Dinopterygium cladoides may have a precingular or apical archeopyle. In view of the modified description given for *Dinopterygium* by Stover and Evitt, 1978, p.205, we shall continue to regard *Oodnadattia* as a *jr syn.* of the former genus. We agree with Morgan, 1980, p.30 that *Dinopterygium tuberculata* is a distinct species.

"alata" (Cookson and Eisenack, 1962b) Below, 1981a, p.107. Lentin and Williams, 1981, p.203 rejected this transfer and retained the species in *Xiphophoridium*.

"cooksoniae" (Kimyai, 1966). NOW *Dinopterygium*.

"pterophora" (Deflandre and Courteville, 1939, p.102) Below, 1981a, p.107. Lentin and Williams, 1981, p.203 rejected the transfer of this species from *Hystrichosphaeridium* to *Oodnadattia*. Instead those authors (p.88) transferred it to the genus *Dinopterygium* Deflandre.

*"*tuberculata"* (Eisenack and Cookson, 1960). NOW *Dinopterygium*.

"OPAEOPSOMUS" Pocock, 1972, p.96. *(non Opaeopsomus* Evitt *in* Pocock, 1972). Pocock used the name *Opaeopsomus* which appeared originally in an unpublished company report by Evitt. See I.C.B.N., Art. 46D. The genus is now considered to be a *nomen dubium* because the holotype and only specimen of the type of the genus, *O. wapellensis*, has been lost (J. Jansonius, pers. comm.). Thus, Lentin and Williams, 1981, p.203 rejected the contention of Stover and Evitt, 1978, p.69 that *Opaeopsomus* is probably congeneric with *Ellipsoidictyum*. For the same reasons, Lentin and Williams, *op.cit.* rejected the opinion of D rh fer and Davies, 1980, p.23 that *Opaeopsomus* is a *jr syn.* of *Dapcodinium*.

*"*wapellensis"* Pocock, 1972, p.97, pl.24, fig.14. Callovian. This species is considered a *nomen dubium* because the holotype and only specimen has been lost (J. Jansonius, pers. comm.).

OPERCULODINIUM Wall, 1967, p.110-111.

azcaratei Troncoso and Doubinger, 1980, p.104-105, pl.2, fig.1-2. Maastrichtian-Danian.

baculatum Yu Jingxian and Zhang Wangping, 1980, p.114-115, pl.4, fig.8-9. Turonian-Early Maastrichtian.

bellulum Islam, 1983a, p.241, pl.2, fig.6. Early Eocene.

bergmannii (Archangelsky, 1969a, p.414, pl.2, fig.8,11) Stover and Evitt, 1978, p.178. Eocene; formerly *Cleistosphaeridium*.

***OPERCULODINIUM* (cont'd)**

**centrocarpum* (Deflandre and Cookson, 1955, p.272, pl.8, fig.3-4) Wall, 1967, p.111. Miocene. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium,* then *Cordosphaeridium.* Morgenroth, 1966a, p.26 included this species as a subspecies of *Cordosphaeridium tiara.* De Coninck, 1969, p.32 questionably included this species as a subspecies of *Cordosphaeridium microtriainum.* This interpretation was rejected by Lentin and Williams, 1973, p.102. See also *Membranilarnacia delicata* which is a *jr syn.* of this species.

subsp. *amplum* (W. Wetzel, 1955, p.38; text-fig.11) Sarjeant, 1984c, p.130-131. Danian. Originally *Hystrichosphaeridium hirsutum* subsp. *amplum;* subsequently *Baltisphaeridium hirsutum* subsp. *amplum,* then *Operculodinium hirsutum* subsp. *amplum.* At the time of the transfer, Sarjeant, 1984c, p.130-131 emended the diagnosis.

subsp. *teokides* (Srivastava and Banerjee, 1969, p.103, pl.1, fig.6-8) Lentin and Williams, 1981, p.204. Eocene; formerly *Hystrichosphaeridium centrocarpum* var. *teokides.* This taxon was elevated to the subspecies level at the time of transfer.

crassum Harland, 1979b, p.536, pl.2, fig.12-14. Late Miocene-Pleistocene.

divergens (Eisenack, 1954, p.67, pl.9, fig.13-16) Stover and Evitt, 1978, p.178. Early Oligocene. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium,* then *Cordosphaeridium.*

echigoense Matsuoka, 1983b, p.126, pl.7, fig.1-5,8. Early Middle Miocene.

erinaceum (Morgenroth, 1966a, p.33-34, pl.8, fig.10-12) Stover and Evitt, 1978, p.178. Early Eocene; formerly *Impletosphaeridium.*

exquisitum Islam, 1983b, p.341, pl.4, fig.8. Middle Eocene.

flucturum Davey, 1969b, p.8, pl.2, fig.3,7-8. Maastrichtian-?Danian.

giganteum Wall, 1967, p.112, pl.16, fig.9-10. Pleistocene-Holocene.

"?hirsutum" (Ehrenberg, 1838, p.109-135, pl.1, fig.13) Lentin and Williams, 1973, p.102. Cretaceous. Originally *Xanthidium;* subsequently *Ovum hispidum,* then *Hystrichosphaeridium,* then *Hystrichosphaera,* then *Baltisphaeridium.* Stover and Evitt, 1978, p.179 considered this to be a "provisionally accepted species". According to Yun, 1981, p.29, the specimen figured in Ehrenberg, 1838, pl.1, fig.8 is *Pervosphaeridium pseudhystrichodinium.* According to Sarjeant, 1984c, p.131-132, *Operculodinium hirsutum* is a *nomen nudum,* since *Xanthidium hirsutum* is an invalid *jr hom.* of *Xanthidium* (now *Staurastrum) hirsutum,* a modern freshwater desmid. Sarjeant, *op.cit.* considered Ehrenberg's fossil specimen to be referable to *Coronifera striolata* (Deflandre) Stover and Evitt.

***OPERCULODINIUM* "?*hirsutum*" (cont'd)**

subsp. "*amplum*" (W. Wetzel, 1955) Lentin and Williams, 1973, p.102. NOW *Operculodinium centrocarpum* subsp. *amplum*. Originally *Hystrichosphaeridium hirsutum* subsp. *amplum;* subsequently *Baltisphaeridium hirsutum* subsp. *amplum*.

subsp. "*minus*" (O. Wetzel, 1933b) Lentin and Williams, 1973, p.102. NOW ?*Coronifera striolata* subsp. *minor;* formerly *Hystrichosphaera hirsuta* subsp. *minor*.

subsp. "*varians*" (O. Wetzel, 1933b) Lentin and Williams, 1973, p.102. NOW *Coronifera striolata* subsp. *varians;* formerly *Hystrichosphaera hirsuta* subsp. *varians*.

?*iaculigerum* (Klement, 1960, p.57, pl.7, fig.10) Sarjeant, 1984a, p.171, pl.2, fig.5; text-fig.7. Middle Kimmeridgian; formerly *Baltisphaeridium*. At the time of the transfer, Sarjeant, *op.cit.* emended the diagnosis and questionably included the species in *Operculodinium*.

israelianum (Rossignol, 1962, p.132, pl.2, fig.3) Wall, 1967, p.111. Pleistocene. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium*.

longispinigerum Matsuoka, 1983b, p.125, pl.9, fig.5-9. Pliocene or younger.

major Jain and Dutta, 1980 *in* Dutta and Jain, 1980, p.68, pl.3, fig.19-22. Late Paleocene.

microtriainum (Klumpp, 1953, p.390, pl.17, fig.6-7) Islam, 1983a, p.241. Late Eocene. Originally *Hystrichosphaeridium;* subsequently *Cordosphaeridium*. The transfer of this species to *Achomosphaera* by Sarjeant, 1981, p.110-112 is herein rejected because of the nature of the processes. We also disagree with that author's interpretation.

multispinosum Ashraf, 1979, p.144, pl.9, fig.9,11. Early Cretaceous.

nanaconulum Islam, 1983a, p.241-242, pl.3, fig.12-14. Early Eocene.

nitidum Islam, 1983a, p.242, pl.4, fig.2-3. Early Eocene.

operculatum (Sah *et al.*, 1970, p.144, pl.1, fig.1-2) Jain, 1982, p.51. Late Cretaceous; formerly ?*Achomosphaera*.

?*personatum* (Corradini, 1973, p.157, pl.23, fig.5-6) Stover and Evitt, 1978, p.179. Senonian; formerly *Lanternosphaeridium*. Stover and Evitt, 1978, p.179 considered this to be a "provisionally accepted species".

placitum Drugg and Loeblich, 1967, p.186, pl.1, fig.9-11b; text-fig.4. Oligocene. Stover and Evitt, 1978, p.179 considered this to be a "problematical species".

OPERCULODINIUM (cont'd)

"pseudorecurvatum" (Morgenroth, 1966a) Stover and Evitt, 1978, p.179. Early Eocene. NOW *Melitasphaeridium;* formerly *Hystrichosphaeridium.*

psilatum Wall, 1967, p.111-112, pl.16, fig.6-8. Holocene.

"pugiatum" (Drugg, 1970b). NOW *Lingulodinium.*

?punctatum Cookson and Eisenack, 1971, p.220, pl.9, fig.6. Cookson and Eisenack, *op.cit.* questionably included this species in *Operculodinium.* Albian-Cenomanian. Stover and Evitt, 1978, p.179 considered this to be a "problematical species". A. Partridge (pers. comm. to Jan Jansonius) stated that the holotype of this species is an acritarch.

?rarispinosum Cookson and Eisenack, 1971, p.220-221, pl.9, fig.7-8. Albian-Cenomanian. Cookson and Eisenack, *op.cit.* questionably included this species in *Operculodinium.* A. Partridge (pers. comm. to Jan Jansonius) stated that the holotype of this species is an acritarch.

severinii (Cookson and Cranwell, 1967, p.208, pl.3, fig.1-2) Islam, 1983b, p.342. Eocene-Oligocene. Originally *Baltisphaeridium;* subsequently *Impletosphaeridium.*

"solarum" (Drugg, 1970b). NOW *Lingulodinium.*

?spiniferum Cookson and Eisenack, 1982, p.47, pl.4, fig.21. Senonian. We provisionally include this species within *Operculodinium,* because of the brief description and poor illustration.

"spinigerum" (Brideaux, 1977). NOW *Protoellipsodinium.*

tiara (Klumpp, 1953, p.390, pl.17, fig.8-10) Stover and Evitt, 1978, p.179. Eocene. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium,* then *Cleistosphaeridium,* then *Cordosphaeridium.*

uncinispinosum (De Coninck, 1969, p.32-33, pl.9, fig.6-8) Islam, 1983b, p.342. Early Eocene; formerly *Cordosphaeridium.* See also *Cleistosphaeridium.*

wallii Matsuoka, 1983b, p.127, pl.7, fig.9; pl.9, fig.1,3-4. Pliocene or younger.

"xanthium" (Benedek, 1972) Stover and Evitt, 1978, p.179. NOW *Lingulodinium.* formerly *Cordosphaeridium.*

OVALICYSTA Bjaerke, 1980, p.71.

**hiata* Bjaerke, 1980, p.71, pl.2, fig.7-12. Toarcian.

"OVOIDINIUM" Davey, 1970, p.351; emend. Lentin and Williams, 1976, p.103-104; emend. Duxbury, 1983, p.61-63. This genus was considered to be a *jr syn.* of *Ascodinium* by Helenes, 1983, p.158 who returned the type of the genus, *O. verrucosum*, to *Ascodinium*, its original designation.

"cinctum" (Cookson and Eisenack, 1958) Davey, 1970, p.354. NOW *Ascodinium;* Originally *Deflandrea.*

"diversum" (Davey, 1979b). NOW *Ascodinium.*

"?fragile" (Norvick, 1976). NOW *Ascodinium.*

"implanum" (Davey, 1979b). NOW *Ascodinium.*

"incomptum" (Duxbury, 1983). NOW *Ascodinium.*

"incorporeum" (Duxbury, 1983). NOW *Ascodinium.*

"?indicum" (Jain and Taugourdeau-Lantz, 1973). NOW *Yalkalpodinium.* Stover and Evitt, 1978, p.217 considered this to be a "provisionally accepted species" of *Ovoidinium.*

"?indistinctum" (Cookson and Eisenack, 1974) Lentin and Williams, 1976, p.105. NOW and formerly *Craspedodinium.* At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Ovoidinium.*

"?kansanum" (Tasch, 1964) Lentin and Williams, 1976, p.105. NOW *Ascodinium.* Originally *Peridinium;* subsequently *?Deflandrea.* At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Ovoidinium.*

"ostium" (Davey, 1970). NOW *Ascodinium verrucosum* subsp. *ostium.*

"ovale" (Cookson and Eisenack, 1970a) Lentin and Williams, 1976, p.105. NOW and formerly *Ascodinium.*

"scabrosum" (Cookson and Hughes, 1964) Davey, 1970, p.352. NOW and formerly *Ascodinium.*

"?torrulosa" (Davey and Verdier, 1973) Below, 1981a, p.124. This transfer is herein rejected and the species is retained in *Canningia.*

"?turrita" (Brideaux, 1977) Below, 1981a, p.125. This transfer is herein rejected and the species is retained in *?Canningia.*

*"*verrucosum"* (Cookson and Hughes, 1964) Davey, 1970, p.351-352. NOW and formerly *Ascodinium.*

subsp. *"ostium"* (Davey, 1970) Lentin and Williams, 1975, p.2153. NOW *Ascodinium verrucosum* subsp. *ostium;* formerly *Ovoidinium ostium.* Transfer of the species as a variety of *Ovoidinium verrucosum* was effected by Davey and Verdier, 1973, p.198.

"waltonii" (Pocock, 1972) Lentin and Williams, 1976, p.105. NOW *Ascodinium.* Originally *Evittia;* subsequently *Pocockia.* O.C.

P

PALAEOCYSTODINIUM Alberti, 1961, p.20.

australinum (Cookson, 1965b, p.140, pl.25, fig.1-4; emend. Malloy, 1972, p.63) Lentin and Williams, 1976, p.89. Paleocene; formerly *Svalbardella.*

benjaminii Drugg, 1967, p.31, pl.3, fig.1; pl.9, fig.3. Maastrichtian-Danian.

?deflandrei Gruas-Cavagnetto, 1968, p.92-93, pl.13, fig.15-19. Late Paleocene.

?denticulatum Alberti, 1961, p.20-21, pl.7, fig.9. Turonian. Alberti, *op. cit.* questionably included this species in *Palaeocystodinium.*

gabonense Stover and Evitt, 1978, p.155 = *Svalbardella australina auct. non* Cookson, 1965b, of Malloy 1972, p.63, pl.1, fig.17,20; holotype pl.1, fig.17. Maastrichtian.

**golzowense* Alberti, 1961, p.20, pl.7, fig.10-12; pl.12, fig.16. Late Eocene-Late Oligocene.

granulatum (Wilson, 1967b, p.226-227, fig.7-9) Lentin and Williams, 1976, p.89. Paleocene; formerly *Svalbardella.*

?hyperxanthum (Vozzhennikova, 1963, p.185, fig.20) Vozzhennikova, 1967, p.152-153. Paleocene; formerly *Cystodiniopsis.* O.C. Stover and Evitt, 1978, p.115 considered this to be a "provisionally accepted species".

lidiae (Gorka, 1963, p.37, pl.5, fig.6) Davey, 1969b, p.12-13. Maastrichtian; formerly *Leiofusa.*

"microgranulatum" Jain and Millepied, 1973, p.29, pl.2, fig.23; pl.3, fig.30. Maastrichtian. Lentin and Williams, 1976, p.89 considered this species to be a *jr syn.* of *Andalusiella polymorpha* (Malloy) Lentin and Williams.

"punctatum" Jain and Millepied, 1973, p.29, pl.2, fig.24; pl.3, fig.26-28. Maastrichtian. Lentin and Williams, 1976, p.89 considered this species to be a *jr syn.* of *Andalusiella polymorpha* (Malloy) Lentin and Williams.

reductum May, 1980, p.84-85, pl.21, fig.20. Campanian-Maastrichtian.

PALAEOCYSTODINIUM (cont'd)

?rhomboides (O. Wetzel, 1933a, p.168, pl.2, fig.17) Lentin and Williams, 1973, p.103. Senonian; formerly *Ceratium* cf. *fusus* forma *rhomboides*. At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Palaeocystodinium*. Lentin and Williams, 1973 elevated *Ceratium* cf. *fusus* forma *rhomboides* to the species level in order to remove fossil forms from *Ceratium fusus*. The assignment of these forms to *C. fusus* had previously been questioned by Eisenack, 1961, p.300-301 and Evitt, 1961c, p.402. As the figured forms most nearly compare with *Palaeocystodinium*, Lentin and Williams, 1973, p.103-104 questionably transferred the forms to this genus.

subsp. *filosum* (O. Wetzel, 1933a, p.169, pl.2, fig.20) Lentin and Williams, 1973, p.103. Senonian; formerly *Ceratium* cf. *fusus* forma *filosum*.

subsp. *incertum* (Deflandre, 1936a, p.29, pl.10, fig.8-9) Lentin and Williams, 1973, p.103. Senonian; formerly *Ceratium* cf. *fusus* forma *incertum*. O.C.

subsp. *nodosum* (O. Wetzel, 1933a, p.169, pl.2, fig.19) Lentin and Williams, 1973, p.104. Senonian; formerly *Ceratium* cf. *fusus* forma *nodosum*.

subsp. *ovatum* (O. Wetzel, 1933a, p.168-169, pl.2, fig.18) Lentin and Williams, 1973, p.104. Senonian; formerly *Ceratium* cf. *fusus* forma *ovatum*.

scabratum Jain *et al.*, 1975, p.12-13, pl.6, fig.63. Danian.

stockmansii Boltenhagen, 1977, p.114-115, pl.23, fig.1-4. Campanian-Maastrichtian.

PALAEOGLENODINIUM Deflandre, 1935, p.227.

**cretaceum* Deflandre, 1935, p.227, pl.7, fig.2-3. ?Senonian.

PALAEOHYSTRICHOPHORA Deflandre, 1935, p.230; emend. Deflandre and Cookson, 1955, p.257.

"brevispinosa" (Pocock, 1962). NOW *Cyclonephelium*.

"dispersa" (Cookson and Eisenack, 1958). NOW *Diconodinium*.

**infusorioides* Deflandre, 1935, p.230-231, pl.8, fig.4. ?Senonian.

"isodiametrica" (Cookson and Eisenack, 1958). NOW *Hystrichodinium*.

***PALAEOHYSTRICHOPHORA* (cont'd)**

"minuta" (Deflandre and Cookson, 1955). NOW *Diconodinium.* Lentin and Williams, 1981, p.82 rejected the contention of Morgan, 1977, p.130 that this species is a *jr syn.* of *Isabelidinium balmei* (as *Alterbia balmei).*

"multispina" (Deflandre and Cookson, 1955). NOW *Diconodinium.*

?muriciformis (Conrad, 1941, p.7, pl.1, fig.k) Lentin and Williams, 1976, p.110. Maastrichtian; formerly *Palaeoperidinium.* At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Palaeohystrichophora.* Sarjeant, 1967b, p.253 recommended transfer of this species to *Palaeohystrichophora.*

"myalupensis" (Churchill and Sarjeant, 1963). NOW *Aquadulcum.*

oblongata Jiabo, 1978, p.89-90, pl.20, fig.7-8. Early Tertiary.

panshanensis Jiabo, 1978, p.89, pl.20, fig.1-6; text-fig.15. Early Tertiary.

paucisetosa Deflandre, 1943, p.507-508; text-fig.26. ?Senonian. Stover and Evitt, 1978, p.235 suggested that this species falls within the range of variability for *Palaeohystrichophora infusorioides.*

"paucispina" (Alberti, 1961). NOW *Rhombodella.*

"pellifera" (Cookson and Eisenack, 1958). NOW *Diconodinium.*

"pikeae" (Churchill and Sarjeant, 1963). NOW *Aquadulcum.*

"spinosissima" (Deflandre, 1938b). NOW *?Pareodinia.*

PALAEOPERIDINIUM Deflandre, 1935, p.227; emend. Sarjeant, 1967b, p.246. See also *Pentagonum* and *Astrocysta* which are *jr synonyms* of this genus.

"alatum" (Conrad, 1941). NOW *?Microdinium.* See also comments by Stover and Evitt, 1978, p.218.

amplum (Harland, 1973, p.673-674, pl.84, fig.1,7; text-fig.8) Lentin and Williams, 1976, p.109. Late Campanian. Originally *Lejeunia;* subsequently *Astrocysta.*

"basilium" (Drugg, 1967, p.13, pl.1, fig.9-11; pl.9, fig.1a-b) Drugg, 1970b, p.810. ?Maastrichtian-Danian; formerly *Peridinium. Jr syn.* of *Palaeoperidinium pyrophorum* according to Stover and Evitt, 1978, p.218.

"bicuneatum" (Deflandre, 1938b). NOW *Dinopterygium.*

"castaneum" (Deflandre, 1935). NOW *Trichodinium.*

PALAEOPERIDINIUM **(cont'd)**

"caulleryi" (Deflandre, 1935). NOW *?Diconodinium.*

"cayeuxii" (Deflandre, 1935). NOW *Phanerodinium.*

"cornutum" Vozzhennikova, 1963, text-fig.14, *nom. nud.* No description given.

"crassinervum" (Deflandre, 1939). NOW *?Leptodinium.*

cretaceum Pocock, 1962, p.80, pl.14, fig.219-221; emend. Davey, 1970, p.359. This species was the type of the genus *"Astrocysta"* Davey, 1970, p.359, which Lentin and Williams, 1976, p.110 considered to be a *jr syn.* of *Palaeoperidinium.* Also formerly *Lejeunia* and *Subtilisphaera.* See also *Palaeoperidinium manumcooksoni* which is a *jr syn.* of this species.

"damasii" (Lejeune-Carpentier, 1942) Lentin and Williams, 1976, p.110. NOW *?Deflandrea.* Originally *Peridinium;* subsequently *?Cooksoniella.*

"deflandrei" Lentin and Williams, 1973, p.105. Lentin and Williams erected this species to accommodate fossil specimens formerly attributed to the modern taxon *Peridinium conicum.* For a description of such forms please refer to Deflandre, 1939b, p.174; holotype pl.4, fig.4. *Jr syn.* of *Palaeoperidinium pyrophorum* according to Stover and Evitt, 1978, p.218.

subsp. *"larjakiense"* (Vozzhennikova, 1967) Lentin and Williams, 1973, p.105. NOW *Palaeoperidinium larjakiense.* Originally *Peridinium conicum* var. *larjakiense.*

"dictyophorum" (Deflandre, 1938b). NOW *Aldorfia.*

"ellipsoideum" (Deflandre, 1936b). NOW *?Microdinium.* See also comments by Stover and Evitt, 1978, p.218.

"eurypylum" (Manum and Cookson, 1964) Evitt, 1975, p.81. NOW *Saeptodinium;* formerly *Scriniodinium.*

"granulatum" (Oleinik, 1976b, p.225-226, pl.1, fig.3-5) Lentin and Williams, 1981, p.210. *Jr hom.* of *P. granulatum* Singh, 1964. NOW *P. oleinikii.*

"granulatum" (Ch. Singh, 1964). NOW *?Apteodinium indicosum;* formerly *Gonyaulacysta indicosa nom. subst.* Brideaux, 1971.

"hansonianum" (Traverse, 1955) Lentin and Williams, 1973, p.105; emend. Evitt, 1974, p.2-3. NOW *Saeptodinium;* formerly *Peridinium.*

huanghuaense (Jiabo, 1978, p.56, pl.1, fig.1-3) Lentin and Williams, 1981, p.210. Early Tertiary; formerly *Pentagonum.*

PALAEOPERIDINIUM (cont'd)

"hyalodermum" (Deflandre, 1939). NOW *?Rhynchodiniopsis.*

larjakiense (Vozzhennikova, 1967, p.71-72, pl.16, fig.1-2) Lentin and Williams, 1981, p.210. Paleocene. Originally *Peridinium conicum* var. *larjakiense;* subsequently *Palaeoperidinium deflandrei* subsp. *larjakiense;* then *Cooksoniella larjakiensis,* then *Palaeoperidinium deflandrei* subsp. *larjakiense.*

"manumcooksoni" (Corradini, 1973, p.176-177, pl.28, fig.4,6) Lentin and Williams, 1976, p.110. Late Cretaceous-Paleocene; formerly *Astrocysta.* Lentin and Williams, 1976, p.110 considered this species to be a *jr syn.* of *Palaeoperidinium cretaceum.*

marginatum (Vozzhennikova, 1967, p.107, pl.46, fig.1,3-4,6) Lentin and Williams, 1976, p.110. Paleocene; formerly *Pentagonum.*

"mecsekense" (Nagy, 1969). NOW *Apteodinium.*

"monacanthum" (Deflandre, 1935). NOW *Apteodinium.*

"mosaicum" (Downie, 1957). NOW *?Leptodinium.*

"muriciforme" (Conrad, 1941). NOW *?Palaeohystrichophora.*

"nuciforme" (Deflandre, 1938b). NOW *Apteodinium.*

"nuciformoides" Gorka, 1965, p.324-325, pl.2, fig.1-2. Sarjeant, 1968, p.227 considered this species to be a *jr syn.* of *Gonyaulacysta nuciformis* (Deflandre) Sarjeant.

"nudum" (Downie, 1957). See *Pareodinia nuda.*

"nudum" (Nagy, 1969). NOW *?Tectatodinium.* See discussion under *"Palaeoperidinium pannonium"* Lentin and Williams.

oleinikii Lentin and Williams, 1981, p.211 *nom. subst. pro Palaeoperidinium granulatum* Oleinik, 1976b, p.225-226, pl.1, fig.3-5, Lentin and Williams, 1981, p.211, *non Palaeoperidinium granulatum* Ch. Singh, 1964. Late Eocene.

"paleocenicum" (Cookson and Eisenack, 1965c) Lentin and Williams, 1976, p.110. NOW *Ginginodinium.* Originally *Peridinium;* subsequently *?Cooksoniella.*

***PALAEOPERIDINIUM* (cont'd)**

"pannonium" Lentin and Williams, 1973, p.106, *nom. subst. pro Palaeoperidinium nudum* Nagy, 1969 (*non Palaeoperidinium nudum* Downie, 1957), p.291, pl.1, fig.1. NOW *?Tectatodinium pannonium*. This species is, according to Nagy, 1969, p.291, most closely comparable to *"Palaeoperidinium nuciforme"* (Deflandre, 1938b) which was transferred to *Gonyaulacysta* by Sarjeant, 1968, p.227 and is now included in *Apteodinium*. Harker and Sarjeant, 1975, p.224 transferred *"Palaeoperidinium pannonium"* to *Phthanoperidinium*. Lentin and Williams, 1976, p.110 proposed that *"Palaeoperidinium pannonium"* be transferred to *Gonyaulacysta* as *?Gonyaulacysta nuda* (Nagy, 1969). After further study of the diagnosis and single illustration *"Palaeoperidinium pannonium"* was questionably transferred to *Tectatodinium*, as *?Tectatodinium nudum* (Nagy, 1969) by Lentin and Williams, 1977b, p.121. However, the correct name of the taxon is *?Tectatodinium pannonium* Lentin and Williams, because the epithet *"nudum"* was illegitimate when originally proposed.

parvum (Harland, 1973, p.672-673, pl.84, fig.3,12-14; text-fig.7) Lentin and Williams, 1976, p.111. Late Campanian; formerly *Lejeunia*.

"pilum" (Gocht, 1959). NOW *?Leptodinium*.

"piriforme" (Conrad, 1941). NOW *Gonyaulacysta*. See also comments by Stover and Evitt, 1978, p.218.

"pyramidale" (Harris, 1973) Lentin and Williams, 1976, p.111. Paleocene. NOW and formerly *Morkallacysta*.

**pyrophorum* (Ehrenberg, 1838, pl.1, fig.1,4) Sarjeant, 1967b, p.246-247. Late Cretaceous; formerly *Peridinium*. At the time of the transfer, Sarjeant, *op.cit.* emended the diagnosis of this species. See also *Palaeoperidinium basilium* and *P. deflandrei* which are *jr synonyms* of this species.

"reticulatum" (Valensi, 1953). NOW *Ellipsoidictyum*.

"rhomboidale" (Gorka, 1965). NOW *?Trichodinium*.

sibiricum (Vozzhennikova, 1963, p.183; text-fig.17a-b) Lentin and Williams, 1976, p.111. Paleocene; formerly *Pentagonum*.

"spinosissimum" (Deflandre, 1938b). NOW *?Pareodinia*.

"spinosum" (Cookson and Hughes, 1964). NOW *Epelidosphaeridia*.

?subconicoides (Lejeune-Carpentier, 1942, p.183-185; text-fig.1-8) Lentin and Williams, 1973, p.106. Senonian; formerly *Peridinium*. At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Palaeoperidinium*.

PALAEOPERIDINIUM (cont'd)

"tabulatum" (Cookson and Eisenack, 1965c) Lentin and Williams, 1976, p.111. NOW and formerly *Ginginodinium*. This transfer was rejected by Stover and Evitt, 1978, p.218.

tenue Schumacker-Lambry, 1978, p.46-47, pl.4, fig.11-13. Paleocene (Landenian).

"velatum" (Conrad, 1941). NOW *?Scriniodinium*. See also comments by Stover and Evitt, 1978, p.218.

"ventriosum" (O. Wetzel, 1933a) Deflandre, 1935. NOW *Cribroperidinium*.

PALAEOSPHAERIUM Gorka, 1965, p.308.

**infrequens* Gorka, 1965, p.308, pl.2, fig.7. Early Kimmeridgian.

PALAEOSTOMOCYSTIS Deflandre, 1937b, p.52; emend. Deflandre, 1966, p.6.

acambra (Sah *et al.*, 1970, p.148, pl.2, fig.28) Yun, 1981, p.73. Late Cretaceous; formerly *Fromea*. Jain, 1982, p.52 believed that this species "appears to be *?Ascostomocystis*".

"apiculata" (Cookson and Eisenack, 1960a). NOW *?Fromea*.

"bakonyensis" (Goczan, 1962). NOW *Pyxidinopsis*.

"chytra" (Drugg, 1967). NOW *Fromea*.

"cretacea" (O. Wetzel, 1933a, p.175, pl.2, fig.28-29) Deflandre, 1937b, p.54. Late Cretaceous; formerly *?Trachelomonas*. *Trachelomonas* is a genus of the Euglenineae. Stover and Evitt, 1978, p.70 considered this species to be an acritarch.

"cylindrica" (Cookson and Eisenack, 1960b). NOW *?Fromea*.

decora Deflandre, 1945, card 850, fig.436a. Late Cretaceous.

"echinulata" (Deflandre, 1937b). NOW *Diacrocanthidium*.

"elongata" (Beju, 1971) Yun, 1981, p.73. This transfer is herein rejected and the species is retained in *Wallodinium*.

"expolita" (Brideaux, 1977). NOW *Fromea*.

"fragilis" (Cookson and Eisenack, 1962b). NOW *Fromea*.

"glabella" (Singh, 1971). NOW *Fromea*.

***PALAEOSTOMOCYSTIS* (cont'd)**

"granulosa" (Cookson and Eisenack, 1974). NOW *Fromea.*

"laevigata" (Drugg, 1967). NOW *?Fromea.*

"laevigata" (Jiabo, 1978). NOW *Bosedinia.* See also *Fromea psilata.*

"minor" (Jiabo, 1978). NOW *Fromea.*

"oblonga" (Deflandre, 1945). NOW *Fromea.*

"pachytheca" (Cookson and Eisenack, 1971). NOW *Fromea.*

"pergamentacea" (Burger, 1980a). NOW *?Leberidocysta.*

"pulchella" Conrad, 1941, p.10; text-fig.3. Stover and Evitt, 1978, p.70 considered this species to be an acritarch.

"punctulosa" Deflandre, 1941, p.22-23, pl.6, fig.11. Stover and Evitt, 1978, p.70 considered this species to be an acritarch.

**reticulata* Deflandre, 1937b, p.53-54. Late Cretaceous. Originally figured in Deflandre, 1935, pl.9, fig.13, *nom. nud.*

"scabrata" (Jiabo, 1978). NOW *Fromea.*

"scrobiculata" (Deflandre and Cookson, 1955) Cookson and Eisenack, 1974, p.79. NOW *Batiacasphaera.* Originally *Leiosphaera;* subsequently *Leiosphaeridia.*

"senilis" (McIntyre and Brideaux, 1980). NOW *Fromea.*

"sinuosa" Cookson and Eisenack, 1960b, p.258, pl.38, fig.16-17. Stover and Evitt, 1978, p.70 considered this species to be an acritarch.

"sphaerica" Deflandre, 1937b, p.54. Originally figured in Deflandre, 1935, pl.9, fig.14, *nom. nud.* Stover and Evitt, 1978, p.70 considered this species to be an acritarch.

"tornatilis" (Drugg, 1978). NOW *Fromea.*

"triquetra" (Brideaux, 1977). NOW *Fromea.*

PALAEOTETRADINIUM Deflandre, 1936b, p.189; emend. Deflandre and Sarjeant, 1970, p.4; emend. Stover and Evitt, 1978, p.70. The inclusion of *Rhombodella* as a *jr syn.* of *Palaeotetradinium* was rejected by Lentin and Williams, 1981, p.242. Accordingly, those authors did not fully accept the emendation of Stover and Evitt, 1978.

PALAEOTETRADINIUM (cont'd)

caudatum (Benson, 1976, p.218,220, pl.13, fig.4-6) Stover and Evitt, 1978, p.71. Late Maastrichtian-Early Paleocene; formerly *Inversidinium*.

"hermesinoides" (O. Wetzel, 1940, p.138-140, pl.5, fig.7). Late Cretaceous. NOW *Veryhachium*. See Harker and Sarjeant, 1975, p.225.

"hyalodermum" Cookson, 1956, p.188, pl.1, fig.12-16. Albian-Cenomanian. Downie and Sarjeant, 1963, p.94 transferred this species to the acritarch genus *Veryhachium* Deunff.

minusculum (Alberti, 1961, p.10-11, pl.1, fig.10; pl.12. fig.4) Stover and Evitt, 1978, p.71. Early Eocene. Originally *Wetzeliella (Rhombodinium)*; subsequently *?Rhombodinium*, then *Inversidinium*. See also *Inversidinium exilimurum* which is a *jr syn*. of this species.

"natans" (Cookson and Eisenack, 1962b). See discussion under *Rhombodella*.

"paucispina" (Alberti, 1961) Stover and Evitt, 1978, p.71. This transfer was rejected by Lentin and Williams, 1981, p.214 and the taxon was included in *Rhombodella*.

**silicorum* Deflandre, 1936b, p.189, pl.9, fig.11. ?Senonian. *P. silicorum* Deflandre, 1934, p.967, text-fig.6, is a *nom. nud*. since the genus *Palaeotetradinium* was not validly published until 1936.

simplex Yu Jingxian, 1982, p.253, pl.8, fig.18-19. Late Kimmeridgian-Berriasian.

PALHISTIODINIA Deflandre, 1938b, p.185.

**arcana* Deflandre, 1938b, p.185, pl.5, fig.10. Oxfordian.

"PALMNICKIA" Eisenack, 1954, p.69. Morgenroth, 1966a, p.40 stated that *Palmnickia* falls within the range of variation found in *Samlandia chlamydophora* Eisenack, 1954. Both Morgenroth, 1966a, p.39 and Benedek, 1972, p.36 considered the type of the genus *Palmnickia*, *P. lobifera*, to be a synonym of *Samlandia chlamydophora* Eisenack, 1954. The remaining species *"Palmnickia californica"* was transferred to *Samlandia* by Lentin and Williams, 1977b, p.123 and to *Danea* by Stover and Evitt, 1978, p.152. The last named transfer was accepted by Lentin and Williams, 1981, p.215. The transfer of *"Palmnickia californica"* to *Danea* is not attributable to Damassa, 1979a, p.818.

PALYNODINIUM Gocht, 1970a, p.135,137-138,140. According to Loeblich and Loeblich, 1971, p.312, the genus *Palynodinium* Gocht, 1970a is invalid as no description or diagnosis is given; see I.C.B.N., Art. 42, par.1. However, this particular requirement of Art. 42 was removed, retroactively, in a later edition of the I.C.B.N. Thus, *Palynodinium* Gocht, 1970a is valid. Description given in Gocht, 1973, p.453.

PALYNODINIUM (cont'd)

**grallator* Gocht, 1970a, p.135,137-138,140; text-fig.2; text-fig.4, no.1-8; text-fig.5, no.1-2. Late Cretaceous.

PARABOHAIDINA Jiabo, 1978, p.43; emend. He Cheng-quan, 1984b, p.155.

granulata Jiabo, 1978, p.44, pl.17, fig.4-6. Early Tertiary.

PARABOHAIDINA (cont'd)

**laevigata* Jiabo, 1978, p.43, pl.15, fig.4; pl.16, fig.1-11; pl.17, fig.1-3. Early Tertiary.

subsp. *laevigata* Jiabo, 1978, p.44, pl.16, fig.7-11. Early Tertiary.

subsp. *minor* Jiabo, 1978, p.44, pl.16, fig.1-6; pl.17, fig.1-3. Early Tertiary.

subsp. *ovata* Jiabo, 1978, p.44, pl.15, fig.4. Early Tertiary.

operculata He Cheng-quan, 1984b, p.155-156, pl.1, fig.19-20. Tertiary.

retirugosa Jiabo, 1978, p.44-45, pl.17, fig.7-9. Early Tertiary.

shangsica He Cheng-quan, 1984b, p.156, pl.1, fig.1-3. Tertiary.

tuberculata He Cheng-quan, 1984b, p.156, pl.1, fig.9. Tertiary.

verrucosa Jiabo, 1978, p.45, pl.17, fig.11. Early Tertiary.

verrurugosa Jiabo, 1978, p.45, pl.17, fig.10. Early Tertiary.

PARAGONYAULACYSTA Johnson and Hills, 1973, p.207; emend. Dörhöfer and Davies, 1980, p.31.

borealis (Brideaux and Fisher, 1976, p.21-22, pl.3, fig.3-4,6-9; pl.4, fig.1-8) Stover and Evitt, 1978, p.116. Late Oxfordian-Berriasian; formerly *Pareodinia*.

**calloviensis* Johnson and Hills, 1973, p.207, pl.2, fig.9,15-16; text-fig.9A-C; emend. Dörhöfer and Davies, 1980, p.31. Early Callovian.

capillosa (Brideaux and Fisher, 1976, p.20-21, pl.2, fig.3-10; pl.3, fig.1- 2,5) Stover and Evitt, 1978, p.116. Late Oxfordian-Berriasian; formerly *Pareodinia*.

retiphragmata Dörhöfer and Davies, 1980, p.31-32, fig.14; 29D-F. Callovian.

PARAIREIANA He Cheng-quan, 1984a, p.768-769 (translation, p.772-773).

**sinensis* He Cheng-quan, 1984a, p.769, pl.1, fig.8-11. Paleocene-Eocene.

PARALECANIELLA Cookson and Eisenack, 1970b, p.323; emend. Elsik, 1977, p.96.

**indentata* (Deflandre and Cookson, 1955, p.292, pl.9, fig.5-7; text-fig.56) Cookson and Eisenack, 1970b, p.323; emend. Elsik, 1977, p.96. Paleocene-Miocene; formerly *Epicephalopyxis*.

"PARANETRELYTRON" Sarjeant, 1966c, p.201. Wiggins, 1975, p.102 considered this genus to be a *jr syn.* of *Pareodinia* Deflandre; emend. Wiggins.

*"*strongylum"* Sarjeant, 1966c, p.201-202, pl.21, fig.5; pl.23, fig.5; text-fig.52. Wiggins, 1975, p.103 considered this species to be a *jr syn.* of *Pareodinia ceratophora* Deflandre.

PAREODINIA Deflandre, 1947c, p.4; emend. Gocht, 1970b, p.153; emend. Johnson and Hills, 1973, p.208; emend. Wiggins, 1975, p.103; emend. Stover and Evitt, 1978, p.116-117. See *Glomodinium* and *Imbatodinium*. See also *Paranetrelytron* which is a *jr syn.* of this genus.

"aceras" (Manum and Cookson, 1964) Davey and Verdier, 1974, p.645. Lentin and Williams, 1975, p.2153 rejected the transfer of this species to *Pareodinia* by Davey and Verdier, *op.cit.* The species has therefore been retained in *Caligodinium* Drugg.

alaskensis Wiggins, 1975, p.104, pl.2, fig.7-8. ?Callovian-Middle Kimmeridgian.

ampullacea Yu Jingxian, 1982, p.236, pl.1, fig.5,8. Late Jurassic-Early Cretaceous.

antennata (Gitmez and Sarjeant, 1972, p.232-233, pl.11, fig.2-3) Wiggins, 1975, p.107. Kimmeridgian; formerly *Imbatodinium*.

"aphelia" Cookson and Eisenack, 1958, p.60, pl.12, fig.3-4,9. Middle Jurassic-Early Cretaceous. Wiggins, 1975, p.103 considered this species to be a *jr syn.* of *Pareodinia ceratophora* Deflandre.

?apotomocerastes Sarjeant, 1972, p.27-28, pl.3, fig.4. Late Bathonian-Early Callovian. Stover and Evitt, 1978, p.117 considered this to be a "provisionally accepted species".

arctica Wiggins, 1975, p.103, pl.2, fig.1-5. Late Jurassic, probably Tithonian.

asperata Riley *in* Fisher and Riley, 1980, p.324, pl.3, fig.6,10. Volgian.

"borealis" (Brideaux and Fisher, 1976). NOW *Paragonyaulacysta*.

PAREODINIA (cont'd)

brachythelis Fensome, 1979, p.29-31, pl.4, fig.3,5-7; text-fig.11. Bajocian-Callovian.

"capillosa" (Brideaux and Fisher, 1976). NOW *Paragonyaulacysta.*

**ceratophora* Deflandre, 1947c, p.4, text-fig.1-3; emend. Gocht, 1970b, p.153-156. Late Callovian. See also *Kalyptea monoceras, Paranetrelytron strongylum, Pareodinia aphelia* and *P. nuda* which are *jr synonyms* of this species.

subsp. *pachyceras* (Sarjeant, 1959, p.337, pl.13, fig.10; text-fig.5a) Lentin and Williams, 1973, p.108. Early Callovian; formerly *Pareodinia ceratophora* var. *pachyceras.* Sarjeant, 1976c, p.10 retained *Pareodinia ceratophora* var. *pachyceras.* His arguments for so doing, however, are inconclusive.

subsp. *scopaea* (Sarjeant, 1972, p.26, pl.2, fig.4) Lentin and Williams, 1973, p.108. Late Bathonian-Early Callovian; formerly *Pareodinia ceratophora* var. *scopaeus.*

communis He Cheng-quan, 1984b, p.159, pl.5, fig.18-20. Tertiary.

curvocervicata Tasch, 1964, p.196, pl.3, fig.1. Albian. Stover and Evitt, 1978, p.117 considered this to be a "problematical species".

"dasyforma" Wiggins, 1975, p.107 *nom. subst. pro Imbatodinium villosum* Vozzhennikova, 1967, p.56, pl.12, fig.1-3; pl.13, fig.1-3; pl.14, fig.1-2; pl.15, fig.1-2 *(non Pareodinia villosa* Tasch, 1964). NOW *Gochteodinia villosa.* Wiggins, 1975, incorrectly cited the species as *Pareodinia villosa* Vozzhennikova. *Imbatodinium villosum* Vozzhennikova was never validly transferred to *Pareodinia.*

elongata Yu Jingxian, 1982, p.236-237, pl.1, fig.6-7. Late Jurassic-Early Cretaceous.

"evittii" (Pocock, 1972) Wiggins, 1975, p.105. NOW *Glomodinium.*

gibberosa Jiabo, 1978, p.48-49, pl.6, fig.14. Early Tertiary.

groenlandica Sarjeant, 1972, p.27, pl.2, fig.2; pl.5, fig.1. Late Bathonian-Early Callovian.

"?imbatodinensis" (Vozzhennikova, 1967) Lentin and Williams, 1977b, p.125. NOW *Batioladinium;* formerly *Imbatodinium.* The transfer of this species from *Imbatodinium* to *"Necrobroomea"* by Wiggins, 1975, p.111 was rejected by Lentin and Williams, 1977b, p.125 because of the nature of the archeopyle and of the antapex in this species. Stover and Evitt, 1978, p.117 considered this to be a "provisionally accepted species" of *Pareodinia.*

PAREODINIA (cont'd)

"kondratjevii" (Vozzhennikova, 1967) Wiggins, 1975, p.104. NOW and formerly *Imbatodinium*. O.C.

minima Yu Jingxian, 1982, p.237, pl.1, fig.9-10,19. Late Kimmeridgian-Berriasian.

minuta Wiggins, 1975, p.104, pl.2, fig.9-10. Late Jurassic.

moderna Kufferath, 1950, p.37-38; text-fig.34. Holocene.

"mutabilis" (Riley *in* Fisher and Riley, 1980). NOW *Gochteodinia*.

"nuda" (Downie, 1957, p.424, pl.20, fig.11; text-fig.2e) Sarjeant, 1967b, p.254. Late Kimmeridgian; formerly *Palaeoperidinium*. Wiggins, 1975, p.103 considered this species to be a *jr syn*. of *Pareodinia ceratophora* Deflandre. Sarjeant, 1976c, p.11 preferred to retain *Pareodinia nuda*, which is characterized by a longer apical horn with separation of the wall layers at the tip. Stover and Evitt, 1978, p.125 agreed with Wiggins, 1975.

"osmingtonensis" (Sarjeant, 1962b) Wiggins, 1975, p.105. NOW and formerly *Pluriarvalium*.

subsp. *"rostrata"* (Wiggins, 1975). NOW *Pluriarvalium osmingtonense* subsp. *rostratum*.

prolongata Sarjeant, 1959, p.335-336, pl.13, fig.8; text-fig.4. Early Callovian.

psilata Jain and Millepied, 1975, p.143-144, pl.3, fig.51. Aptian-Albian.

"ramosa" (Cookson and Eisenack, 1958) Wiggins, 1975, p.107. The transfer of this species from *Broomea* to *Pareodinia* by Wiggins, *op.cit.* was rejected by Lentin and Williams, 1976, p.144.

rectangularis Yu Jingxian, 1982, p.236, pl.1, fig.1. Late Kimmeridgian-Berriasian.

"reticulopilosa" (Dodekova, 1975) Stover and Evitt, 1978, p.117. NOW and formerly *Glomodinium*.

robusta Wiggins, 1975, p.105, pl.3, fig.1-4. Late Jurassic.

rostrata Yu Jingxian, 1982, p.236, pl.1, fig.2-3. Late Kimmeridgian-Berriasian.

"spinosa" (Alberti, 1961). NOW *?Apteodinium albertii*.

***PAREODINIA* (cont'd)**

?spinosissima (Deflandre, 1938b, p.179, pl.9, fig.11) Wiggins, 1975, p.107. Late Jurassic. Originally *Palaeoperidinium;* subsequently *Palaeohystrichophora,* then *?Acanthaulax.* Stover and Evitt, 1978, p.117 considered this to be a "provisionally accepted species".

"tripartita" Johnson and Hills, 1973, p.208, pl.2, fig.12-14,17-18; pl.3, fig. 1-2; text-fig.11A-C. Late Bathonian. Wiggins, 1975, p.105 considered this species to be a *jr syn.* of *Pareodinia evittii* (Pocock) Wiggins.

var. *"acuta"* Johnson and Hills, 1973, pl.2, fig.12; *nom. nud.* No description; name appears only in explanation of plates.

var. *"obtusa"* Johnson and Hills, 1973, p.208. Incorrect name for *"Pareodinia tripartita* subsp. *tripartita".* See discussion under *"P. tripartita* subsp. *tripartita".* Wiggins, 1975, p.105 considered this subspecies to be a *jr syn.* of *Pareodinia evittii* (Pocock) Wiggins.

subsp. *"rotunda"* (Johnson and Hills, 1973, p.209, pl.3, fig.1-2; text-fig.11C) Lentin and Williams, 1975, p.2153. Late Bathonian; formerly *Pareodinia tripartita* var. *rotundus.* Wiggins, 1975, p.105 considered this subspecies to be a *jr syn.* of *Pareodinia evittii* (Pocock) Wiggins.

subsp. *"tripartita"* (Johnson and Hills, 1973, p.208, pl.2, fig.?12,13,17-18; text-fig.11B) Lentin and Williams, 1975, p.2153. Late Bathonian; formerly *Pareodinia tripartitus* var. *obtusus.* Johnson and Hills cite the same holotype for *Pareodinia tripartitus* and *Pareodinia tripartitus* var. *obtusus;* therefore *Pareodinia tripartitus* var. *obtusus* is an incorrect name for *P. tripartitus* var. *tripartitus* (I.C.B.N., Art. 26). Wiggins, 1975, p.105 considered *Pareodinia tripartita* to be a *jr syn.* of *Pareodinia evittii* (Pocock) Wiggins.

"verrucosa" (Vozzhennikova, 1967) Wiggins, 1975, p.105. NOW *Gochteodinia;* formerly *Imbatodinium.*

villosa Tasch, 1964, p.195-196, pl.1, fig.9. Albian. Stover and Evitt, 1978, p.117 considered this to be a "problematical species".

"PARVOCAVATUS" Gitmez, 1970, p.306. *Jr syn.* of *Dingodinium* according to Fisher and Riley, 1980, p.319-320 who transferred the two species, *P. spinosus* and *P. tuberosus,* the type of the genus, to *Dingodinium.* These authors did not give the full citation for the transfer of *Parvocavatus spinosus* to *Dingodinium* and it was therefore invalid. However, Davey, 1979c, p.60 had previously, and correctly, transferred *P. spinosus* to *Dingodinium.* See also Mehrotra and Sarjeant, 1984b, p.296.

PARVOCYSTA Bjaerke, 1980, p.59-60,62.

barbata Bjaerke, 1980, p.65, pl.1, fig.10,14-15,18; text-fig.3F. Toarcian.

***PARVOCYSTA* (cont'd)**

**bullula* Bjaerke, 1980, p.62,64, pl.1, fig.2-6, text-fig.3C. Toarcian.

contracta Bjaerke, 1980, p.64-65, pl.1, fig.7-8; text-fig.3B. Toarcian.

?*cracens* Bjaerke, 1980, p.66, pl.4, fig.16; text-fig.3D. Toarcian. Bjaerke, *op.cit.* questionably included this species in *Parvocysta*.

nasuta Bjaerke, 1980, p.65-66, pl.1, fig.11-12; text-fig.3A. Toarcian.

PARVULODINIUM Dodekova, 1975, p.29.

**clavatum* Dodekova, 1975, p.30, pl.6, fig.4-9; text-fig.8. Late Bathonian.

penitabulatum Davies, 1983, p.27-28, pl.9, fig.9-11,13-15,17-19; text-fig.24. Toarcian-Early Bajocian.

PAUCIBUCINA Jiabo, 1978, p.73-74.

**dongyingensis* Jiabo, 1978, p.74, pl.24, fig.1,14. Early Tertiary.

liaoningensis Jiabo, 1978, p.74, pl.24, fig.2. Early Tertiary.

simplex Jiabo, 1978, p.74, pl.24, fig.3-4. Early Tertiary.

PAUCISPHAERIDIUM Bujak *et al.,* 1980, p.30,32.

cylindratum Islam, 1983b, p.342, pl.1, fig.12-14. Early Eocene.

**inversibuccinum* (Davey and Williams, 1966b, p.82, pl.12, fig.3) Bujak *et al.,* 1980, p.32. Early Eocene; formerly ?*Litosphaeridium*. The species was emended by Bujak *et al., op.cit.* at the time of the transfer.

PENTADINIUM Gerlach, 1961, p.164-165; emend. Benedek *et al.,* 1982, p.266-268. See also *Planinosphaeridium* which is a *jr syn.* of this genus.

?*circumsutum* (Morgenroth, 1966b, p.5, pl.1, fig.3-4) Stover and Evitt, 1978, p.180. Early Oligocene; formerly *Pterodinium*. Stover and Evitt, 1978, p.180 considered this to be a "provisionally accepted species".

favatum Edwards, 1982, p.113, pl.1, fig.4,7,10-13; pl.2, fig.1-12. Middle Eocene.

goniferum Edwards, 1982, p.114,116, pl.4,fig.1-9. Middle Eocene.

**laticinctum* Gerlach, 1961, p.165-166, pl.26, fig.5-6; text-fig.6-7; emend. Benedek *et al.,* 1982, p.268-272. Middle Oligocene-Middle Miocene.

subsp. *granulatum* Gocht, 1969, p.29-30, pl.9, fig.17-18; text-fig.20. Middle Oligocene.

PENTADINIUM laticinctum **(cont'd)**

subsp. *imaginatum* Benedek, 1972, p.43-44, pl.2, fig.11; pl.6, fig.9. Late Oligocene. See also *Toenisbergia.*

subsp. *"lophophorum"* (Benedek, 1972). NOW *Pentadinium lophophorum.*

lophophorum (Benedek, 1972, p.44, pl.6, fig.8; text-fig.19) Benedek *et al.*, 1982, p.275-279. Middle Oligocene; formerly *Pentadinium laticinctum* subsp. *lophophorum.* Benedek *et al., op cit.* emended this taxon when they raised it to the species level.

membranaceum (Eisenack, 1965, p.151, pl.14, fig.4; pl.15, fig.6; text-fig.1) Stover and Evitt, 1978, p.180. Late Eocene-Early Oligocene; formerly *Planinosphaeridium.*

polypodum Edwards, 1982, p.113-114, pl.3, fig.1-12. Middle Eocene.

taeniagerum Gerlach, 1961, p.167-168, pl.26, fig.8-9,12,15; text-fig.8. Middle Oligocene-Middle Miocene. Benedek *et al.*, 1982, p.275 suggested "that this name be restricted to the holotype and paratype 1170/79 (598 ..."

subsp. *imaginatum* Benedek, 1972, p.45-46, pl.6, fig.12. Late Oligocene. See also *Toenisbergia.*

subsp. *lophophorum* Benedek, 1972, p.45, pl.6, fig.13. Middle Oligocene.

"PENTAGONUM" Vozzhennikova, 1963, p.183. Lentin and Williams, 1976, p.161 considered this genus to be a *jr syn.* of *Palaeoperidinium.* They accordingly transferred the two validly published species, *"Pentagonum sibiricum"*, the type of the genus, and *"P. marginatum"*, to *Palaeoperidinium.* See below for details of other species.

"conicoides" Vozzhennikova, 1963, *nom. nud.* No description. The name appears only in the description for text-fig.17, where it is erroneously used for *P. sibiricum.*

"granulatum" (Oleinik, 1976b). NOW *Palaeoperidinium.*

"huanghuaense" (Jiabo, 1978). NOW *Palaeoperidinium.*

PERIDICTYOCYSTA Cookson and Eisenack, 1974, p.70.

**mirabilis* (Cookson and Eisenack, 1958, p.48, pl.8, fig.3-5) Cookson and Eisenack, 1974, p.70. Late Jurassic; formerly *Cannosphaeropsis.*

PERIDINITES Lefèvre, 1933a, p.418. (Type of the genus was selected by Deflandre, 1945, card 800). See also *Lithoperidinium* which is a *jr syn.* of this genus.

***PERIDINITES* (cont'd)**

barbadensis Lefèvre, 1933a, p.416. (Figured in Lefèvre, 1933b, text-fig.9-12). Early Tertiary.

diodon Lefèvre, 1933a, p.417-418. (Figured in Lefèvre, 1933b; text-fig.23). Early Tertiary.

globosus Lefèvre, 1933a, p.416. (Figured in Lefèvre, 1933b, text-fig.15-16). Early Tertiary.

maculatus (Vozzhennikova, 1967, p.117-118, pl.49, fig.1-12; pl.50, fig.1-8) Lentin and Williams, 1973, p.110. Early Oligocene; formerly *Lithoperidinium*.

oamaruensis (Deflandre, 1933, p.265; text-fig.1-7) Deflandre, 1945, card 806-809. Tertiary; formerly *Lithoperidinium*.

ovalis Lefèvre, 1933a, p.417. (Figured in Lefèvre, 1933b, text-fig.21-22). Early Tertiary.

**parvulus* Lefèvre, 1933a, p.416. (Figured in Lefèvre, 1933b, text-fig.6-8). Early Tertiary. Designated as nomenclatural type by Deflandre, 1945, Fiche #800.

perforatus Lefèvre, 1933a, p.418. (Figured in Lefèvre, 1933b, text-fig.25-30). Early Tertiary.

piriformis Lefèvre, 1933a, p.417. (Figured in Lefèvre, 1933b, text-fig.17-18). Early Tertiary.

subsp. *compactus* (Lefèvre, 1933a, p.417; figured in Lefèvre, 1933b, text-fig.19-20) Lentin and Williams, 1973, p.110. Early Tertiary; formerly *Peridinites piriformis* var. *compactus*. O.C.

rossicus (Deflandre, 1940, p.266, text-fig.1-4) Deflandre, 1945, card 817-818. Eocene; formerly *Lithoperidinium*.

sphaericus Lefèvre, 1933a, p.416-417. (Figured in Lefèvre, 1933b, text-fig. 13-14). Early Tertiary.

subsp. *minor* (Lefevre, 1933b, p.224; text-fig.24) Lentin and Williams, 1973, p.111. Early Tertiary; formerly *Peridinites sphaericus* var. *minor*.

PERIDINIUM Ehrenberg, 1832, p.38. Modern genus defined from the motile stage. The current generic assignment of fossil dinoflagellate cysts formerly included in *Peridinium* is given below.

"basilium" (Drugg, 1967). See *Palaeoperidinium basilium*.

"comatum" (Morgenroth, 1966b). NOW *Phthanoperidinium*.

***PERIDINIUM* (cont'd)**

conicum (Gran) Ostenfeld and Schmidt. Modern species defined from the motile stage. Fossil cysts assigned to this species by Deflandre, 1939b were included in *Palaeoperidinium deflandrei* by Lentin and Williams, 1973, p.105. Stover and Evitt, 1978, p.218 considered *Palaeoperidinium deflandrei* to be a *jr syn.* of *Palaeoperidinium pyrophorum.*

var. *"larjakiense"* (Vozzhennikova, 1967). NOW *Palaeoperidinium larjakiense.*

"crenulatum" (De Coninck, 1975). NOW *Phthanoperidinium.*

"damasii" (Lejeune-Carpentier, 1942). NOW *?Deflandrea.*

"delitiense" (Ehrenberg, 1838). NOW *Spongodinium.*

"diamantum" (Churchill and Sarjeant, 1963). NOW *Gonyaulacysta.*

"eocenicum" (Cookson and Eisenack, 1965a). NOW *?Phthanoperidinium.*

"galeatum" (Lejeune-Carpentier, 1942). NOW *Deflandrea.*

"hansonianum" (Traverse, 1955). NOW *Saeptodinium.*

"illustrans" (O. Wetzel, 1933a). NOW *?Phthanoperidinium.*

"kansanum" (Tasch, 1964). NOW *?Ascodinium.*

"lambdoideum" (Nagy, 1966). NOW *Phthanoperidinium.*

"paleocenicum" (Cookson and Eisenack, 1965c). NOW *Ginginodinium;* see also *Palaeoperidinium* and *?Cooksoniella.*

pedunculatum Schütt, 1895. Modern species. *Peridinium* cf. *pedunculatum* forma *divaricans* (O. Wetzel, 1933a). NOW *Phelodinium tricuspe* subsp. *divaricans.*

"pleum" (Tasch, 1964). NOW *Deflandrea.*

"ponticum" (Wall and Dale *in* Wall *et al.,* 1973). NOW *Protoperidinium.*

"pyrophorum" (Ehrenberg, 1838). NOW *Palaeoperidinium.*

"resistente" (Morgenroth, 1966a). NOW *Phthanoperidinium.*

"schizokeras" (De Coninck, 1975). NOW *?Phthanoperidinium.*

"stellatum" (Wall and Dale, 1968). NOW *Stelladinium.*

***PERIDINIUM* (cont'd)**

"stockmansii" (De Coninck, 1975). NOW *Phthanoperidinium.*

"subconicoides" (Lejeune-Carpentier, 1942). NOW *?Palaeoperidinium.*

"tricuspis" (O. Wetzel, 1933a). NOW *Phelodinium.*

"ventriosum" (O. Wetzel, 1933a). NOW *Cribroperidinium.*

PERISSEIASPHAERIDIUM Davey and Williams, 1966b, p.78.

"eisenackii" Davey and Williams, 1969, p.6, = *Hystrichosphaeridium anthophorum sensu* Eisenack, 1958, p.402, pl.26, fig.1-2 *non* Cookson and Eisenack, 1958. Late Aptian. Davey and Verdier, 1974, p.640 and Duxbury, 1980, p.126 considered this species to be a *jr syn.* of *Hystrichosphaerina schindewolfii* Alberti, 1961.

insolitum Davey, 1982b, p.19-20, pl.4, fig.8-10. Portlandian.

**pannosum* Davey and Williams, 1966b, p.78-79, pl.3, fig.5; pl.11, fig.8; text-fig.15. Early Eocene.

PERVOSPHAERIDIUM Yun, 1981, p.26-27.

brevispinum (Norvick, 1976, p.53, pl.4, fig.5-6) Below, 1982c, p.27. Cenomanian; formerly *?Exochosphaeridium.*

cenomaniense (Norvick, 1976, p.52-53, pl.4, fig.4,8) Below, 1982c, p.27. Cenomanian; formerly *?Exochosphaeridium.*

monasteriense Yun, 1981, p.27-28, pl.5, fig.3,5,8; text-fig.7. Early Santonian.

**pseudhystrichodinium* (Deflandre, 1937b, p.73, pl.15, fig.3-4) Yun, 1981, p.29. Late Cretaceous. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium,* then *?Exochosphaeridium.*

truncatum (Davey, 1969a, p.164-166, pl.7, fig.1-3) Below, 1982c, p.27. Cenomanian. Originally *Exochosphaeridium striolatum* var. *truncatum;* subsequently *Exochosphaeridium striolatum* subsp. *truncatum,* then *?Exochosphaeridium truncatum.*

truncigerum (Deflandre, 1937b, p.71-72, pl.13, fig.6-7) Yun, 1981, p.27. Senonian. Originally *Hystrichosphaeridium;* subsequently *?Litosphaeridium,* then *Cordosphaeridium.* The transfer of this species to *Exochosphaeridium* by Davey, 1978, p.894 was rejected by Lentin and Williams, 1981, p.58. The transfer of this species to *?Florentinia* by Below, 1982c, p.10 and to *?Tityrosphaeridium* by Sarjeant, 1981, p.121 are herein rejected.

PHALLOCYSTA Dörhöfer and Davies, 1980, p.26-27; emend. Riding, 1984b, p.117.

PHALLOCYSTA (cont'd)

**eumekes* Dörhöfer and Davies, 1980, p.27, fig.12; 24D-E,G; 26H,J-K; 27A-I; emend. Riding, 1984b, p.119. Toarcian-Bajocian/Bathonian.

PHANERODINIUM Deflandre, 1937a, p.110.

**cayeuxii* (Deflandre, 1935, p.229, pl.6, fig.2-3) Deflandre, 1937a, p.110. Senonian; formerly *Palaeoperidinium*.

subsp. *"laeve"* (Lejeune-Carpentier, 1951) Lentin and Williams, 1973, p.112. NOW *Druggidium laeve;* formerly *Phanerodinium cayeuxii* var. *laeve*.

"fourmarieri" (Lejeune-Carpentier, 1951). NOW *Druggidium*.

setiferum Deflandre, 1937a, p.112-114; text-fig.5. Senonian.

PHELODINIUM Stover and Evitt, 1978, p.117-118.

africanum Biffi and Grignani, 1983, p.140, pl.6, fig.1-6. Oligocene.

boloniense (Riegel, 1974, p.354-355, pl.1, fig.6-10; text-fig.3) Riegel and Sarjeant, 1982, p.296-297. ?Senonian. Originally *Deflandrea;* subsequently *Ceratiopsis*, then *Senegalinium*. The species was emended by Riegel and Sarjeant, *op.cit.* at the time of the transfer.

gaditanum (Riegel, 1974, p.356-357, pl.2, fig.8-9; pl.3, fig.1-2) Lentin and Williams, 1981, p.223; emend. Riegel and Sarjeant, 1982, p.297-299. ?Senonian. Originally *Deflandrea;* subsequently *Senegalinium,* then *Lejeunia,* then *Lejeunecysta*.

magnificum (Stanley, 1965, p.218-219, pl.20, fig.1-6) Stover and Evitt, 1978, p.118. Paleocene. Originally *Deflandrea;* subsequently *Lejeunia,* then *Senegalinium*. See also *Lejeunecysta*.

nigericum Biffi and Grignani, 1983, p.140, pl.3, fig.3,5. Oligocene.

pachyceras Liengjarern *et al.*, 1980, p.486-487, pl.54, fig.4. Late Eocene-Early Oligocene.

**pentagonale* (Corradini, 1973, p.175, pl.28, fig.3) Stover and Evitt, 1978, p.118. Senonian. Originally *Deflandrea;* subsequently *Lejeunia,* then *Senegalinium*. See also *Lejeunecysta*.

pumilum Liengjarern *et al.*, 1980, p.487, pl.54, fig.2. Late Eocene.

tricuspis (O. Wetzel, 1933a, p.166, pl.2, fig.14) Stover and Evitt, 1978, p.118. Senonian. Originally *Peridinium;* subsequently *Lejeunia,* then *Astrocysta,* then *Senegalinium*. See *Lejeunecysta*. See also *Lejeunia kozlowskii* which is a *jr syn.* of this species.

PHELODINIUM tricuspis (cont'd)

subsp. *divaricans* (O. Wetzel, 1933a) *comb. nov., stat. nov.* 1933a *Peridinium* cf. *pedunculatum* forma *divaricans* O. Wetzel, p.165-166, text-fig.2. Late Cretaceous.

PHOBEROCYSTA Millioud, 1969, p.431-432. See also *Xenascus.*

"ceratioides" (Deflandre, 1937b) Davey and Verdier, 1971, p.26. NOW *Xenascus;* formerly *Pseudoceratium.*

?dubia Corradini, 1973, p.182, pl.29, fig.6a-b. Senonian. Corradini, *op.cit.* questionably included this species in *Phoberocysta.*

"gochtii" (Corradini, 1973). NOW *Xenascus.*

**neocomica* (Gocht, 1957, p.172-178, pl.19, fig.1-5; pl.20, fig.1-7; text-fig. 7-16) Millioud, 1969, p.432. Hauterivian; formerly *?Wetzeliella.*

subsp. *circulata* (Gocht, 1957, p.178; text-fig.14) Lentin and Williams, 1973, p.112. Hauterivian; formerly *?Wetzeliella neocomica* forma *circulata.*

subsp. *convexa* (Gocht, 1957, p.178, pl.20, fig.1-2) Lentin and Williams, 1973, p.112. Hauterivian; formerly *?Wetzeliella neocomica* forma *convexa.*

subsp. *cruciformis* (Gocht, 1957, p.176-177, pl.19, fig.5; pl.20, fig.3; text-fig.9-10) Lentin and Williams, 1973, p.112. Hauterivian; formerly *?Wetzeliella neocomica* forma *cruciformis.*

subsp. *dedecosa* (Gocht, 1957, p.177, text-fig.11) Lentin and Williams, 1973, p.112. Hauterivian; formerly *?Wetzeliella neocomica* forma *dedecosa.*

subsp. *pteridia* (Gocht, 1957, p.178, pl.20, fig.5) Lentin and Williams, 1973, p.112. Hauterivian; formerly *?Wetzeliella neocomica* forma *pteridia.*

subsp. *subovalis* (Gocht, 1957, p.177, text-fig.12-13) Lentin and Williams, 1973, p.113. Hauterivian; formerly *?Wetzeliella neocomica* forma *subovalis.*

"sarjeantii" (Corradini, 1973). NOW *Xenascus.*

"serpaglii" (Corradini, 1973). NOW *Xenascus.*

tabulata Raynaud, 1978, p.393-394, pl.1, fig.1-2. Berriasian-Valanginian.

PHTHANOPERIDINIUM Drugg and Loeblich, 1967, p.182; emend. Edwards and Bebout, 1981, p.36; emend. Islam, 1982, p.306.

alectrolophum Eaton, 1976, p.295,298, pl.17, fig.10-11; text-fig.23A. Late Eocene.

amiculum Liengjarern *et al.*, 1980, p.487-488, pl.53, fig.4. Late Eocene.

**amoenum* Drugg and Loeblich, 1967, p.182, pl.1, fig.1-5; text-fig.1. Oligocene.

brooksii Edwards and Bebout, 1981, p.38,40, pl.1-10; text-fig.2-4. Middle-Late Eocene.

?campoense Caro, 1973, p.359-360, pl.4, fig.7. Early Eocene. Stover and Evitt, 1978, p.119 considered this to be a "provisionally accepted species".

comatum (Morgenroth, 1966b, p.1, pl.1, fig.1-2) Eisenack and Kjellström, 1971a, p.907. Early Oligocene; formerly *Peridinium*. The transfer of this species from *Peridinium* to *Phthanoperidinium* is not attributable to Eaton, 1976, p.294. See also *Phthanoperidinium tritonium* which is a *jr syn.* of this species.

coriciterium Islam, 1982, p.307-309, pl.1, fig.6,8-11; text-fig.1. Early Eocene.

coreoides (Benedek, 1972, p.20, pl.9, fig.4) Lentin and Williams, 1976, p.76; emend. Benedek and Sarjeant, 1981, p.328-330, fig.3/2,4 (holotype); text-fig.5. Middle Oligocene; formerly *Hystrichogonyaulax*. Stover and Evitt, 1978, p.118 considered *P. coreoides* to be a *jr syn.* of *Phthanoperidinium comatum*. However, re-evaluation of the holotype by Benedek and Sarjeant, 1981, indicates that it is a separate species.

crenulatum (De Coninck, 1975, p.96, pl.17, fig.5-7) Lentin and Williams, 1977b, p.131. Early Eocene (Ypresian); formerly *Peridinium*.

"?diamantum" (Churchill and Sarjeant, 1963) Lentin and Williams, 1973, p.113. NOW *Gonyaulacysta;* formerly *Peridinium*. At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Phthanoperidinium*.

echinatum Eaton, 1976, p.298-299, pl.17, fig.8-9,12; text-fig.23B. Early-Late Eocene. See *Phthanoperidinium stockmansii*. See also *?P. pseudoechinatum* which is a *jr syn.* of this species.

?eocenicum (Cookson and Eisenack, 1965a, p.119-120, pl.11, fig.1-5) Lentin and Williams, 1973, p.113. Late Eocene; formerly *Peridinium*. At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Phthanoperidinium*. The transfer of this species from *Peridinium* to *?Phthanoperidinium* is not attributable to Eaton, 1976, p.294. See *Phthanoperidinium resistente* and *P. stockmansii*.

PHTHANOPERIDINIUM (cont'd)

filigranum (Benedek, 1972, p.12-13, pl.4, fig.3) Benedek and Sarjeant, 1981, p.325-327, fig.8/1-2; text-fig.4 (holotype). Middle Oligocene. Originally *?Deflandrea;* subsequently *?Vozzhennikovia.* The transfer of this species to *Dioxya* by Morgan, 1977, p.131 was rejected by Lentin and Williams, 1981, p.287. The transfer of this species to *Phthanoperidinium* is not attributable to Bujak and Davies, 1983, p.163.

flebile Liengjarern *et al.,* 1980, p.488-489, pl.54, fig.6. Early Oligocene.

geminatum Bujak *in* Bujak *et al.,* 1980, p.72,74, pl.19, fig.8-12; text-fig.20D, 22A. Late Eocene.

?illustrans (O. Wetzel, 1933a, p.167, pl.2, fig.15) Lentin and Williams, 1973, p.113. Senonian; formerly *Peridinium.* At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Phthanoperidinium.* Stover and Evitt, 1978, p.119 considered this to be a "problematical species".

indistinctum Islam, 1982, p.311, pl.2, fig.1-5; text-fig.2. Middle Eocene.

lambdoideum (Nagy, 1966, p.39, pl.1, fig.1-3; text-fig.1a-b) Eisenack and Kjellström, 1971a, p.909. Early Pliocene; formerly *Peridinium.* Stover and Evitt, 1978, p.119 considered this to be a "problematical species".

levimurum Bujak *in* Bujak *et al.,* 1980, p.74, pl.19, fig.13-16; text-fig.20E,22B. Late Eocene.

multispinum Bujak *in* Bujak *et al.,* 1980, p.74, pl.19, fig.17-19; text-fig.20F. Late Eocene.

obscurum Harland and Sharp, 1980, p.291,293-295, pl.1-2; text-fig.2-3. Late Eocene.

"pannonium" (Lentin and Williams, 1973) Harker and Sarjeant, 1975, p.224. NOW *?Tectatodinium pannonium.* Originally *Gonyaulacysta* (as *?G. nuda);* subsequently *Palaeoperidinium nudum,* then *?Palaeoperidinium pannonium;* then *Tectatodinium nudum.* The transfer of this species to *Phthanoperidinium* Drugg and Loeblich by Harker and Sarjeant, 1975, p.224 was rejected by Lentin and Williams, 1977b, p.131. See discussion under *"Palaeoperidinium pannonium".*

polytrix (Benedek, 1972, p.20, pl.6, fig.1) Lentin and Williams, 1976, p.76; emend. Benedek and Sarjeant, 1981, p.330-333, fig.2/4,6 (holotype); text-fig.6. Middle Oligocene; formerly *Hystrichogonyaulax.* At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Phthanoperidinium.* The emendation by Benedek and Sarjeant, 1981, removes the need for a tentative assignment.

***PHTHANOPERIDINIUM* (cont'd)**

"?pseudoechinatum" Bujak *in* Bujak *et al.*, 1980, p.75-76, pl.19, fig.20; text-fig.20C. Late Eocene. Islam, 1982, p.309 considered this species to be a *jr syn.* of *Phthanoperidinium echinatum.* Bujak *in* Bujak et al., op.cit. questionably included this species in *Phthanoperidinium.*

resistente (Morgenroth, 1966a, p.5, pl.2, fig.1-2) Eisenack and Kjellström, 1971a, p.911. Early Eocene; formerly *Peridinium.* The transfer of this species from *Peridinium* to *Phthanoperidinium* is not attributable to Eaton, 1976, p.294. Stover and Evitt, 1978, p.119 suggested that this species may be a *jr syn.* of *Phthanoperidinium eocenicum.*

?schizokeras (De Coninck, 1975, p.97, pl.17, fig.16-17) Lentin and Williams, 1977b, p.131. Early Eocene (Ypresian); formerly *Peridinium.* Stover and Evitt, 1978, p.119 considered this to be a "provisionally accepted species".

stockmansii (De Coninck, 1975, p.97-98, pl.17, fig.18-37) Lentin and Williams, 1977b, p.131. Early Eocene (Ypresian); formerly *Peridinium.* Stover and Evitt, 1978, p.119 suggested that this species is conspecific with *Phthanoperidinium eocenicum.* According to De Coninck, 1977, p.40, the specimens illustrated in De Coninck, 1975, pl.17, fig.18-36 are referable to *Phthanoperidinium echinatum.*

stoveri (Liengjarern *et al.*, 1980) Islam, 1982, p.313. This species is herein retained as the type of the genus *Vectidinium* - which was considered by Islam, 1982, p.313 to be a *jr syn.* of *Phthanoperidinium* - for the reasons given under *Vectidinium.*

"tritonium" Eaton, 1976, p.299-300, pl.17, fig.2-3,6-7; text-fig.23C,24. Early-Late Eocene. *Jr syn.* of *Phthanoperidinium comatum* according to Bujak *in* Bujak *et al.*, 1980, p.72.

PIPERODINIUM Mudie *in* Scott *et al.*, 1984, p.214.

**perplexum* Mudie *in* Scott *et al.*, 1984, p.214-215, pl.1, fig.1-3. Recent.

"PLANINOSPHAERIDIUM" Eisenack, 1965, p.151. *Jr syn.* of *Pentadinium* according to Stover and Evitt, 1978, p.179-180. These authors transferred the type and single species of the genus, *Planinosphaeridium membranaceum,* to *Pentadinium.*

PLATYCYSTIDIA Cookson and Eisenack, 1960a, p.12. Stover and Evitt, 1978, p.296 considered this to be an acritarch genus.

**diptera* Cookson and Eisenack, 1960a, p.14, pl.3, fig.22. ?Late Albian-Cenomanian.

"PLETHYSYRINX" Sarjeant, 1981, p.106. This genus is herein considered to be a *jr syn.* of *Cyclapophysis* Benson, 1976, and the type species of the genus *"Plethysyrinx", P. lemniscata,* is transferred to *Cyclapophysis.* The species *"?Plethysyrinx" lata* is included in *Cordosphaeridium* because the "trabeculae" described by Sarjeant, 1981, p.106-107, pl.5, fig.2-3 appear to be debris on the specimen.

PLURIARVALIUM Sarjeant, 1962b, p.260. Wiggins, 1975, p.102 considered this genus to be a *jr syn.* of *Pareodinia* Deflandre; emend. Wiggins. He accordingly transferred the type of the genus, *"Pluriarvalium osmingtonense"* to *Pareodinia.* Stover and Evitt, 1978, p.113-114 retained *Pluriarvalium* as a valid genus and rejected the transfer of the type species to *Pareodinia.* Dörhöfer and Davies, 1980, p.32 considered *Pluriarvalium* to be a *jr syn.* of *Pareodinia.*

**osmingtonense* Sarjeant, 1962b, p.262, pl.1, fig.5; text-fig.6. Late Oxfordian; see also *Pareodinia.*

subsp. *rostratum* (Wiggins, 1975, p.106-107, pl.5, fig.1-2) Stover and Evitt, 1978, p.119. Late Jurassic; formerly *Pareodinia osmingtonensis* subsp. *rostrata.*

"POCOCKIA" Lentin and Williams, 1973, p.114, *nom. subst. pro Evittia* Pocock, 1972, p.93 *(non Evittia* Brito, 1967). Type of genus *P. cincta* (Cookson and Eisenack, 1958) Lentin and Williams, 1973, p.114. Lentin and Williams, 1976, p.162 considered the genus *Pocockia* to be a *jr syn.* of *Ovoidinium.* Accordingly, they transferred the two species *"Pocockia cincta"* and *"Pocockia waltonii"* to *Ovoidinium.* These species were subsequently transferred to *Ascodinium* by Helenes, 1983, p.260-261.

POLYGONIFERA Habib, 1972, p.376. The emendation of this genus, based on a new species from the Aptian, by Mehrotra and Sarjeant, 1984c, p.46 is herein rejected because these authors failed to re-examine the holotype of *P. evittii,* the type of the genus. Since the nature of the operculum is unknown in this species, it would seem advisable to maintain the genus *Polygonifera* as a monospecific genus. The new species *P. eisenackii* is transferred to *Leberidocysta.*

"chlamydata" (Cookson and Eisenack, 1962b) Mehrotra and Sarjeant, 1984c, p.48. The above transfer by Mehrotra and Sarjeant, *op.cit.* is herein rejected and the species is retained in *Leberidocysta.*

"eisenackii" (Mehrotra and Sarjeant, 1984c). NOW *Leberidocysta.*

**evittii* Habib, 1972, p.376, pl.5, fig.1-2. Oxfordian-Kimmeridgian.

"staffinensis" (Gitmez, 1970) Davey, 1982b, p.31. NOW *Meiourogonyaulax.*

POLYKRIKOS Bütschli, 1873, p.673. Modern genus defined from the motile stage. The single fossil cyst species included in this genus, *P. tentaculatum* O. Wetzel, 1933a, has been transferred to *Wetzelodinium* Deflandre.

POLYSPHAERIDIUM Davey and Williams, 1966b, p.91-92; emend. Bujak *et al.*, 1980, p.32,34. See also *Hemicystodinium* which is a *jr syn.* of this genus.

POLYSPHAERIDIUM **(cont'd)**

"?amalthei" (W. Wetzel, 1966) Riley and Sarjeant, 1972, p.2. NOW *?Dapsilidinium;* formerly *Hystrichosphaeridium*. Stover and Evitt, 1978, p.76 considered this to be a "provisionally accepted species" of *Polysphaeridium*.

"ambiguum" (Deflandre, 1937a) Yun, 1981, p.44. Pending re-examination of the holotype, we herein reject the transfer of this species to the genus *Polysphaeridium,* preferring to retain it in the acritarch genus *Micrhystridium* Deflandre emend. Lister.

asperum (Maier, 1959, p.319, pl.33, fig.2) Davey and Williams, 1969, p.6. Middle Miocene. Originally *Hystrichosphaeridium;* subsequently *Dapsilidinium*. At the time of the transfer, Davey and Williams, *op.cit.* questionably included this species in *Polysphaeridium*. Based on the re-examination of the holotype, Sarjeant, 1983, p.113-114 emended this species and rejected its transfer to *Dapsilidinium*.

"assamicum" (Mehrotra, 1983). NOW *Dapsilidinium*.

"?belgicum" (Sarjeant, 1969, p.15 = *Hystrichosphaeridium fluctuans sensu* Pastiels, 1948, p.40, pl.3, fig.16 *non* Eisenack, 1938, p.230-231, pl.16, fig.1). NOW *?Dapsilidinium*. Stover and Evitt, 1978, p.76 considered this to be a "provisionally accepted species" of *Polysphaeridium*.

biformum Islam, 1983b, p.342-343, pl.4, fig.3,6. Middle Eocene.

"?caminuspinum" (Wall, 1965a) Riley and Sarjeant, 1972, p.3. NOW *?Dapsilidinium;* formerly *Hystrichosphaeridium*. At the time of the transfer, Riley and Sarjeant, *op.cit.* questionably included this species in *Polysphaeridium*. Stover and Evitt, 1978, p.76 considered this to be an acritarch.

"cephalum" (Kar, 1979). NOW *?Batiacasphaera*.

"chems" (Below, 1982c). NOW *Dapsilidinium*.

congregatum (Stover, 1977, p.79, pl.3, fig.39-44) Bujak *et al.*, 1980, p.34. Middle Oligocene; formerly *Hemicystodinium*.

"conispinum" (Davey and Verdier, 1973) Stover and Evitt, 1978, p.76. NOW and formerly *Litosphaeridium*. See also *?Dapsilidinium*. Stover and Evitt, 1978, p.76 considered this to be a "problematical species" of *Polysphaeridium*.

"?daveyi" (Boltenhagen, 1977). NOW *Dapsilidinium*. Boltenhagen, *op.cit.* questionably included this species in *Polysphaeridium*.

***POLYSPHAERIDIUM* (cont'd)**

"?deflandrei" (Valensi, 1947) Davey and Williams, 1969, p.6. NOW *?Dapsilidinium;* formerly *Hystrichosphaeridium.* At the time of the transfer, Davey and Williams, *op.cit.* questionably included this species in *Polysphaeridium.*

"duma" (Below, 1982c). NOW *Dapsilidinium.*

"?elongatum" (Jain and Millepied, 1975). NOW *?Dapsilidinium.* Stover and Evitt, 1978, p.76 considered this to be a "provisionally accepted species" of *Polysphaeridium.*

"?fabium" (Tasch, 1964, p.195, pl.2, fig.5) Davey and Williams, 1969, p.6. Albian; formerly *Hystrichosphaeridium.* At the time of the transfer, Davey and Williams, *op.cit.* questionably included this species in *Polysphaeridium.* Stover and Evitt, 1978, p.76 considered this species to be a synonym of *Kiokansium unituberculatum* (Tasch) Stover and Evitt.

"?flexuosum" (Davey *et al.*, 1966) Below, 1982c, p.28-29. NOW and formerly *?Cleistosphaeridium.* We herein reject this transfer and retain the species in *?Cleistosphaeridium.*

"?follium" (Tasch, 1964, p.195, pl.1, fig.8) Davey and Williams, 1969, p.6. Albian; formerly *Hystrichosphaeridium.* At the time of the transfer, Davey and Williams, *op.cit.* questionably included this species in *Polysphaeridium.* Stover and Evitt, 1978, p.76 considered this species to be a synonym of *"Kiokansium unituberculatum"* (Tasch) Stover and Evitt.

"?fucosum" (Valensi, 1955a) Davey and Williams, 1969, p.6. NOW *?Dapsilidinium.* Originally *Micrhystridium;* subsequently *Hystrichosphaeridium.* At the time of the transfer, Davey and Williams, *op.cit.* questionably included this species in *Polysphaeridium.*

"giganteum" (Caro, 1973). NOW *Cleistosphaeridium.*

"granulosum" (Jain and Millepied, 1975). NOW *Dapsilidinium.*

"laminaspinosum" (Davey and Williams, 1966b). NOW *Dapsilidinium.*

"?langii" (Wall, 1965a) Riley and Sarjeant, 1972, p.3. NOW *?Dapsilidinium;* formerly *Hystrichosphaeridium.* At the time of the transfer, Riley and Sarjeant, *op.cit.* questionably included this species in *Polysphaeridium.* O.C.

"?majus" (Lejeune-Carpentier, 1940) Davey and Williams, 1969, p.6. NOW *Amphorosphaeridium.* Originally *Hystrichosphaeridium;* subsequently *?Polysphaeridium,* then *Cordosphaeridium.* At the time of the transfer, Davey and Williams, *op.cit.* questionably included this species in *Polysphaeridium.* Stover and Evitt, 1978, p.76 considered this to be a "provisionally accepted species" of *Polysphaeridium.*

***POLYSPHAERIDIUM* (cont'd)**

"?marsupium" (Tasch, 1964, p.193, pl.3, fig.16) Davey and Williams, 1969, p.6. Albian; formerly *Hystrichosphaeridium*. At the time of the transfer, Davey and Williams, *op.cit.* questionably included this species in *Polysphaeridium*. Stover and Evitt, 1978, p.76 considered this species to be a synonym of *"Kiokansium unituberculatum"* (Tasch) Stover and Evitt.

"microtriainum" (Klumpp, 1953) Kar, 1979, p.33. NOW *Operculodinium*. The transfer of this species to *Polysphaeridium* by Kar, 1979 was rejected by Lentin and Williams, 1981, p.231 who retained it in the genus *Cordosphaeridium*.

"multispinosum" (Davey, 1974). NOW *Dapsilidinium*.

ornamentum Jain and Tandon, 1981, p.12-13, pl.2, fig.35. Middle Eocene.

"pastielsii" (Davey and Williams, 1966b). NOW *Dapsilidinium*.

"?paulinae" (Valensi, 1953) Davey and Williams, 1969, p.6. NOW *?Dapsilidinium*; formerly *Hystrichosphaeridium*. At the time of the transfer, Davey and Williams, *op.cit.* questionably included this species in *Polysphaeridium*. Stover and Evitt, 1978, p.76 considered this to be a "problematical species" of *Polysphaeridium*.

"?perovatum" (Tasch, 1964, p.194, pl.3, fig.13) Davey and Williams, 1969, p.6. Albian; formerly *Hystrichosphaeridium*. At the time of the transfer, Davey and Williams, *op.cit.* questionably included this species in *Polysphaeridium*. Stover and Evitt, 1978, p.76 considered this species to be a synonym of *"Kiokansium unituberculatum"* (Tasch) Stover and Evitt.

"pseudocolligerum" (Stover, 1977). NOW *Dapsilidinium*.

"?pumilum" (Davey and Williams, 1966b). NOW *?Dapsilidinium*. Stover and Evitt, 1978, p.76 considered this to be a "provisionally accepted species" of *Polysphaeridium*.

"?punctatum" (Jain and Millepied, 1975). NOW *?Dapsilidinium*. Stover and Evitt, 1978, p.76 considered this to be a "provisionally accepted species" of *Polysphaeridium*.

"?rhabdophorum" (Valensi, 1955b) Davey and Williams, 1969, p.7. NOW *?Dapsilidinium*; formerly *Hystrichosphaeridium*. At the time of the transfer, Davey and Williams, *op.cit.* questionably included this species in *Polysphaeridium*.

"?simplex" (White, 1842) Davey and Williams, 1969, p.7. NOW *Dapsilidinium*. Originally *Xanthidium*; subsequently *Hystrichosphaeridium*. At the time of the transfer, Davey and Williams, *op.cit.* questionably included this species in *Polysphaeridium*. Stover and Evitt, 1978, p.76 considered this to be a "problematical species".

POLYSPHAERIDIUM (cont'd)

**subtile* Davey and Williams, 1966b, p.92, pl.11, fig.1; emend. Bujak *et al.*, 1980, p.34. Early Eocene. See also *Hemicystodinium taugourdeaui* and *Polysphaeridium zoharyi* which are *jr synonyms* of this species.

subsp. *ktana* (Rossignol, 1964, p.88, pl.2, fig.6-7,10; pl.3, fig.11) Islam, 1983b, p.343. Pleistocene. Originally *Hystrichosphaeridium zoharyi* var. *ktana;* subsequently *Hemicystodinium zoharyi* subsp. *ktana,* then *Polysphaeridium zoharyi* subsp. *ktana.* See also *?Hystrichosphaeridium breviatum* which is a *jr syn.* of this species.

"?tribrachiosum" (Tasch, 1964, p.195, pl.1, fig.3) Davey and Williams, 1969, p.7. Albian; formerly *Hystrichosphaeridium.* At the time of the transfer, Davey and Williams, *op.cit.* questionably included this species in *Polysphaeridium.* Stover and Evitt, 1978, p.76 considered this species to be a synonym of *"Kiokansium unituberculatum"* (Tasch) Stover and Evitt.

"trompetum" (Cookson and Eisenack, 1982). NOW *?Cordosphaeridium.*

"warrenii" (Habib, 1976). NOW *Dapsilidinium.*

"williamsii" (Boltenhagen, 1977). NOW *?Cleistosphaeridium.*

"williereae" (Boltenhagen, 1977). NOW *?Apectodinium.*

"zoharyi" (Rossignol, 1962, p.132, pl.2, fig.10) Bujak *et al.*, 1980, p.34. Pleistocene. Originally *Hystrichosphaeridium;* subsequently *Hemicystodinium.* Islam, 1983b, p.343 considered this species to be a *jr syn.* of *Polysphaeridium subtile* Davey and Williams.

subsp. *"ktana"* (Rossignol, 1964) Lentin and Williams, 1981, p.232. NOW *Polysphaeridium subtile* subsp. *ktana.* Originally *Hystrichosphaeridium zoharyi* var. *ktana;* subsequently *Hemicystodinium zoharyi* subsp. *ktana.*

POLYSTEPHANEPHORUS Sarjeant, 1961b, p.1096. Although Sarjeant created this genus in 1961, none of the species were correctly transferred until Downie and Sarjeant, 1965, p.141 complied with all the rules for combinations in listing species within *Polystephanephorus.* Sarjeant, 1976c, p.18 is incorrect in his interpretation of I.C.B.N. Art. 33. The contention by Duxbury, 1980, p.125-126 that *Polystephanephorus* is a *jr syn.* of *Hystrichosphaerina* was rejected by Lentin and Williams, 1981, p.232 and Davey, 1982b, p.20.

"anthophorus" (Cookson and Eisenack, 1958, p.43) Davey, 1979c, p.65. NOW *Stiphrosphaeridium.* Originally *Hystrichosphaeridium.* The transfer of this species from *Oligosphaeridium* to *Polystephanephorus* by Davey, *op.cit.* was rejected by Lentin and Williams, 1981, p.200.

POLYSTEPHANEPHORUS (cont'd)

**calathus* (Sarjeant, 1961a, p.104, pl.14, fig.7; text-fig.7) Downie and Sarjeant, 1965, p.141. Early Oxfordian; formerly *Polystephanosphaera*. The transfer of this species to *Hystrichosphaerina* by Duxbury, 1980, p.126 was rejected by Lentin and Williams, 1981, p.232.

euryanthus Cookson and Eisenack, 1974, p.70-71, pl.24, fig.14. ?Neocomian-Albian.

paracalathus (Sarjeant, 1960a, p.143-144, pl.6, fig.4; text-fig.3b) Downie and Sarjeant, 1965, p.141. Middle Callovian; formerly *Polystephanosphaera*. The transfer of this species to *Hystrichosphaerina* by Duxbury, 1980, p.126 was rejected by Lentin and Williams, 1981, p.232.

"sarjeantii" (Gitmez, 1970). NOW *Emmetrocysta*.

"?sarrisii" (Archangelsky, 1969a). NOW *?Senoniasphaera*. Archangelsky, 1969a, p.411 questionably included this species in *Polystephanephorus*.

"schindewolfii" (Alberti, 1961) Yun, 1981, p.36. The transfer of this species to *Polystephanephorus* by Yun, *op.cit.* is herein rejected and the species is retained in *Hystrichosphaerina*, since the morphology of the former genus is inadequately known.

"speciosus" (Alberti, 1961) Riley and Sarjeant, 1972, p.3. NOW and formerly *Cannosphaeropsis*. The transfer of this species to *Polystephanephorus* was rejected by Stover and Evitt, 1978, p.144.

"urnaformis" (Cookson, 1953) Downie and Sarjeant, 1965, p.141. NOW *Emmetrocysta*.

"POLYSTEPHANOSPHAERA" Sarjeant, 1960a, p.140-142. This genus was rejected by Sarjeant, 1961b, p.1095-1096 and the type species, *Polystephanosphaera valensii*, was invalidly transferred to *Systematophora*. The transfer was correctly carried out by Downie and Sarjeant, 1965, p.146. Other species formerly included in *"Polystephanosphaera"* have been assigned to *Polystephanephorus* Sarjeant.

"PONTIADINIUM" Stover and Evitt, 1978, p.180. Chen, 1982, p.36 transferred the type and single species of the genus, *Pontiadinium inequicornutum*, to *Komewuia*, thereby making *Pontiadinium* a *jr syn.* of *Komewuia*.

*"*inequicornutum"* (Baltes, 1971 *ex* Stover and Evitt, 1978). NOW *Komewuia*. Baltes, 1971, included this species in the genus *Diconodinium* but failed to designate a type; therefore, according to I.C.B.N. Art.37, the name was invalid. Stover and Evitt, 1978, p.180, by designating a lectotype (pl.2, fig.1 of Baltes, 1971), validated the species and designated it the type and only species of the genus *Pontiadinium*. Chen, 1982, p.36 transferred this species to *Komewuia*.

PRIONODINIUM Leffingwell and Morgan, 1977, p.293-294.

**alaskense* Leffingwell and Morgan, 1977, p.294-295, pl.1, fig.1-2; pl.2, fig.1-5, pl.3, fig.4; text-fig.4. Late Neocomian.

alveolatum Leffingwell and Morgan, 1977, p.295-297, pl.1, fig.4-6; pl.2, fig. 6-8; text-fig.5. Late Neocomian.

PRISMATOCYSTIS Habib, 1969, p.98. Stover and Evitt, 1978, p.296 considered this to be an acritarch genus.

"cylindrica" (Habib, 1970). NOW *Wallodinium.* See also *Hexagonifera.*

**ewingii* Habib, 1969, p.98, pl.3, fig.11. Albian-Early Cenomanian.

PROLIXOSPHAERIDIUM Davey *et al.*, 1966, p.171; emend. Davey, 1969a, p.160.

anasillum Erkmen and Sarjeant, 1980, p.64-65, pl.4, fig.2,9; pl.5, fig.3. Late Callovian-Late Kimmeridgian.

basifurcatum Dodekova, 1969, p.21-22, pl.5, fig.1-6; text-fig.G. Tithonian.

capitatum (Cookson and Eisenack, 1960b, p.252, pl.39, fig.9) Singh, 1971, p.342. Oxfordian-Kimmeridgian; formerly *Hystrichosphaeridium.* See also *Tenua* and *Batiacasphaera.*

conulum Davey, 1969a, p.160-161, pl.8, fig.5-6. Cenomanian.

"deirense" Davey *et al.*, 1966, p.171-172, pl.3, fig.2; text-fig.45. Middle Barremian. This species, the type of the genus, was considered to be a *jr syn.* of *Prolixosphaeridium parvispinum* (Deflandre, 1937b) Davey *et al.*, 1969, by Davey and Verdier, 1974, p.636-637. *P. parvispinum* therefore becomes the correct name of the type of the genus. We herein reject the contention of Below, 1982c, p.31 that this taxon is a subspecies of *Prolixosphaeridium parvispinum.*

"elongatum" Jain, 1977, p.185, pl.4, fig.48-49. Early Albian. This species is herein considered to be *jr syn.* of *Prolixosphaeridium parvispinum.*

granulosum (Deflandre, 1937b, p.77, pl.16, fig.4 as *Hystrichosphaeridium xanthiopyxides* var. *granulosum)* Davey *et al.*, 1966, p.172. Senonian. Elevated to specific rank as *Baltisphaeridium granulosum* by Sarjeant, 1962b, p.264. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium.*

mixtispinosum (Klement, 1960, p.58, pl.6, fig.17-19) Davey *et al.*, 1969, p.17. Early Kimmeridgian; formerly *Baltisphaeridium.*

PROLIXOSPHAERIDIUM (cont'd)

**parvispinum* (Deflandre, 1937b, p.77, pl.16, fig.5, as *Hystrichosphaeridium xanthiopyxides* var. *parvispinum)* Davey *et al.*, 1969, p.17. Late Aptian. Elevated to specific rank as *Hystrichosphaeridium parvispinum* by Cookson and Eisenack, 1958, p.45. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium.* The type of the genus *Prolixosphaeridium, P. deirense,* is considered to be a *jr syn.* of *P. parvispinum* by Davey and Verdier, 1974, p.636-637; the latter species therefore becomes the type of the genus. See also *Prolixosphaeridium elongatum* which is a *jr syn.* of this species.

subsp. *"deirense"* (Davey *et al.*, 1966) Below, 1982c, p.31. See *Prolixosphaeridium deirense.*

?spissum (McIntyre and Brideaux, 1980, p. 20, pl. 7, fig.1-9) Lentin and Williams, 1981, p.234. Valanginian; formerly *Cleistosphaeridium.* At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Prolixosphaeridium.*

"?torynum" (Cookson and Eisenack, 1960b) Eisenack and Kjellström, 1971a, p.951. NOW *Egmontodinium;* formerly *Hystrichosphaeridium.* At the time of the transfer, Eisenack and Kjellström, *op.cit.* questionably included this species in *Prolixosphaeridium.* See also *Tanyosphaeridium.*

"?xanthiopyxides" (O. Wetzel, 1933b) Davey *et al.*, 1969, p.17. NOW *Tanyosphaeridium.* Originally *Hystrichosphaera;* subsequently *Hystrichosphaeridium,* then *Baltisphaeridium.* At the time of the transfer, Davey *et al.*, *op.cit.* questionably included this species in *Prolixosphaeridium.*

PROMINANGULARIA Jiabo, 1978, p.47.

dongyingensis Jiabo, 1978, p.48, pl.19, fig.13-17. Early Tertiary.

**granulata* Jiabo, 1978, p.47-48, pl.19, fig.7-12; text-fig.8. Early Tertiary.

laevigata Jiabo, 1978, p.48, pl.19, fig.5-6. Early Tertiary.

micirugosa He Cheng-quan, 1984b, p.158, pl.2, fig.12-17. Tertiary.

PROTOELLIPSODINIUM Davey and Verdier, 1971, p.28.

clavulum Davey and Verdier, 1974, p.637-638, pl.93, fig.7; emend. Duxbury, 1983, p.53. Aptian. See also *Protoellipsodinium spinigerum* which is a *jr syn.* of this species.

densispinum Morgan, 1980, p.30-31, pl.24, fig.1-3. Middle Aptian-Cenomanian.

seghire Below, 1981a, p.110-111, pl.11, fig.9-11,13-15; pl.15, fig.17-19; text-fig.71. Hauterivian.

PROTOELLIPSODINIUM seghire **(cont'd)**

subsp. *medaaure* Below, 1981a, p.110-111, pl.11, fig.9,13-15; pl.15, fig. 17-18; text-fig.71. Hauterivian.

"spinigerum" (Brideaux, 1977, p.30, pl.12, fig.8-9; pl.13, fig.1-11) Lentin and Williams, 1981, p.235. Barremian; formerly *Operculodinium*. Duxbury, 1983, p.53 considered this species to be a *jr syn.* of *Protoellipsodinium clavulum*.

**spinocristatum* Davey and Verdier, 1971, p.28-29, pl.5, fig.2,5,11. Albian.

spinosum Davey and Verdier, 1971, p.29-30, pl.5, fig.10. Albian.

touile Below, 1981a, p.111-112, pl.11, fig.8,16-17; pl.15, fig.15-16; text-fig. 71. Aptian.

subsp. *mugatae* Below, 1981a, p.112, pl.11, fig.8,17; pl.15, fig.15-16; text-fig.71.

verrucosum Yu Jingxian, 1982, p.248, pl.8, fig.6,11. Late Jurassic-Early Cretaceous.

PSALIGONYAULAX Sarjeant, 1966b, p.136; emend. Sarjeant, 1982, p.44-45. Lentin and Williams, 1981, p.235 rejected the contention of Below, 1981a, p.52 that this genus is a *jr syn.* of *Gonyaulacysta* Deflandre.

"apatela" (Cookson and Eisenack, 1960b) Sarjeant, 1969, p.15. NOW *Tubotuberella;* formerly *Scriniodinium.*

australica Cookson and Eisenack, 1982, p.37-38, pl.2, fig.13-15. Oxfordian-Early Kimmeridgian.

"?cypraea" (Ioannides *et al.*, 1977). NOW *?Gonyaulacysta.* Stover and Evitt, 1978, p.182 considered this to be a "provisionally accepted species" of *Psaligonyaulax.*

**deflandrei* Sarjeant, 1966b, p.137-138, pl.14, fig.7-8; text-fig.35; emend. Sarjeant, 1982, p.45-46. Cenomanian. The transfer of this species to *Gonyaulacysta* by Below, 1981a, p.53 was rejected by Lentin and Williams, 1981, p.235.

"dualis" (Brideaux and Fisher, 1976). NOW *Gonyaulacysta.*

"galeata" (Cookson and Eisenack, 1960a) Davey and Verdier, 1973, p.195. NOW *Hystrichosphaeropsis;* originally *Scriniodinium.*

"simplicia" (Cookson and Eisenack, 1961b) Sarjeant, 1969, p.15. NOW *?Impagidinium;* formerly *Rottnestia.*

PSEUDOCERATIUM Gocht, 1957, p.166; emend. Dörhöfer and Davies, 1980, p.39. See also *Eopseudoceratium* which is a *jr syn.* of this genus.

"ceratioides" (Deflandre, 1937b). NOW *Xenascus.*

"dettmanniae" (Cookson and Hughes, 1964). NOW *Endoceratium.*

expolitum Brideaux, 1971, p.102-103, pl.30, fig.105-106,108. Middle-Late Albian. See also *Pseudoceratium regium* which is a *jr syn.* of this species.

gochtii Neale and Sarjeant, 1962, p.446,448, pl.20, fig.3-4; text-fig.5. Late Hauterivian-Middle Barremian. The retention of this species in *Pseudoceratium* by Stover and Evitt, 1978, p.78 was rejected by Lentin and Williams, 1981, p.236. We herein accept the opinion of Stover and Evitt, *op.cit.*

"gochtii" (Pocock, 1962). *Jr hom.* of *Pseudoceratium gochtii* Neale and Sarjeant, 1962. NOW *Pseudoceratium hansgochtii.*

"hansgochtii" Lentin and Williams, 1981, p.236, *nom. subst. pro Pseudoceratium gochtii* Pocock, 1962, p.79, pl.14, fig.213-214 *non* Neale and Sarjeant, 1962, p.446. Late Albian-Early Cenomanian. Ch. Singh, 1971, p.320 considered this species, as *Pseudoceratium gochtii,* to be a *jr syn.* of *Broomea* (now *Batioladinium*) *jaegeri* Alberti.

"ludbrookii" (Cookson and Eisenack, 1958) Eisenack, 1961, p.290. NOW *Endoceratium;* formerly *Ceratocystidiopsis.*

"?nudum" (Gocht, 1957). NOW *Odontochitina.* Gocht, *op.cit.*, p.168 questionably included this species in *Pseudoceratium.*

parvum Michael, 1964, p.28, pl.2, fig.1. Early Barremian.

**pelliferum* Gocht, 1957, p.166-168, pl.18, fig.1-2; text-fig.1-3; emend. Dörhöfer and Davies, 1980, p.39. Valanginian-Hauterivian.

subsp. *solocispinum* (Davey, 1974, p.68, pl.9, fig.6) Lentin and Williams, 1975, p.2154. Middle-Late Barremian; formerly *Pseudoceratium pelliferum* var. *solocispinum.*

"regium" Ch. Singh, 1971, p.375-376, pl.66, fig.2-4; pl.67, fig.1-2. Harker and Sarjeant, 1975, p.226 considered this species to be a *jr syn.* of *Pseudoceratium expolitum* Brideaux.

retusum Brideaux, 1977, p.14-15, pl.4, fig.10-12; pl.5, fig.1-2, 5-10. Barremian-Aptian.

robustum Michael, 1964, p.29, pl.2, fig.2. Early Barremian.

"?tetracanthum" (Gocht, 1957). NOW *Muderongia.* Gocht, *op.cit.*, p.168 questionably included this species in *Pseudoceratium.*

PSEUDOCERATIUM **(cont'd)**

"turneri" (Cookson and Eisenack, 1958). NOW *Endoceratium*.

PSEUDOCERATIUM subgen. ***"EOPSEUDOCERATIUM"*** Neale and Sarjeant, 1962, p.446. This subgenus was raised to the genus level by Lentin and Williams, 1973, p.54. We herein accept the opinion of Stover and Evitt, 1978, p.77 that *Eopseudoceratium* is a *jr syn.* of *Pseudoceratium*. The single species, *"Eopseudoceratium gochtii"*, is now included in *Pseudoceratium*.

PSEUDODEFLANDREA Alberti, 1959a, p.91-92. Lentin and Williams 1976, p.125 stated that this monospecific genus is based on a single complete specimen of *Pseudodeflandrea gigantea*. Alberti also recorded the hypocyst of another specimen. Lentin and Williams, *op.cit.* suggested that *Pseudodeflandrea* may represent an aberrant form, or be a species of *Odontochitinopsis* Eisenack or *Xenascus* Cookson and Eisenack.

**gigantea* Alberti, 1959a, p.92; text-fig.1. Middle Oligocene.

PSEUDOFROMEA Burger, 1980b, p.276. There is some uncertainty as to whether this fossil is a dinoflagellate.

**collaris* Burger, 1980b, p.276-277, fig.12A-C,13. Barremian.

PSEUDOKOMEWUIA He Cheng-quan, 1980, p.1-2.

PSEUDOKOMEWUIA subgen. ***CONDOCORPIDIA*** He Cheng-quan, 1980, p.4.

radiata He Cheng-quan, 1984b, p.167, pl.5, fig.14. Tertiary.

retirugosa He Cheng-quan, 1980, p.5-6, pl.1, fig.15-16. Oligocene.

subsp. *pygmea* He Cheng-quan, 1984b, p.168, pl.5, fig.16-17; text-fig.8. Tertiary.

shangsica He Cheng-quan, 1984b, p.168-169, pl.4, fig.14-20; pl.5, fig.1-6; text-fig.9. Tertiary.

subsp. *pygmea* He Cheng-quan, 1984b, p.169, pl.5, fig.1-6. Tertiary.

subsp. *shangsica* He Cheng-quan, 1984b, p.169, pl.4, fig.14-20; text-fig.9. Tertiary.

tuberculata He Cheng-quan, 1984b, p.169, pl.5, fig.15. Tertiary.

unicornis He Cheng-quan, 1980, p.5, pl.1, fig.13-14; text-fig.4. Oligocene.

PSEUDOKOMEWUIA subgen. ***PSEUDOKOMEWUIA*** He Cheng-quan, 1980, p.2.

cerciata He Cheng-quan, 1980, p.3-4, pl.1, fig.7-8. Oligocene.

***PSEUDOKOMEWUIA* subgen. *PSEUDOKOMEWUIA* (cont'd)**

granulata He Cheng-quan, 1980, p.4, pl.1, fig.9-12. Oligocene.

**laevigata* He Cheng-quan, 1980, p.2-3, pl.1, fig.1-6; text-fig.1-3. Oligocene.

subsp. *fusiformis* He Cheng-quan, 1984b, p.165, pl.3, fig.5-9. Tertiary.

subsp. *subtilis* He Cheng-quan, 1984b, p.165, pl.3, fig.10-13; text-fig.4. Tertiary.

PSEUDOSTEPHODINIUM Yu Jingxian *et al.*,, 1981, p.262.

**sanshuiense* Yu Jingxian *et al.*,, 1981, p.262, pl.1, fig.33-34. Late Cretaceous.

PTEROCYSTIDIOPSIS Deflandre, 1937b, p.90. Stover and Evitt, 1978, p.296 stated that this is not a dinoflagellate.

?*angulosa* Deflandre, 1941, p.23-24, pl.6, fig.6-10. Late Jurassic. Deflandre, *op.cit.* questionably included this species in *Pterocystidiopsis*.

"*halosa*" (Filatoff, 1975) Courtinat *in* Courtinat and Gaillard, 1980, p.80. The transfer of this species to *Pterocystidiopsis* was rejected by Lentin and Williams, 1981, p.237 who retained the species in the genus *Caddasphaera*.

ornata Deflandre, 1937b, p.91-92, pl.18, fig.1-3. Late Cretaceous.

**stephaniana* Deflandre, 1937b, p.91, pl.17, fig.7-9. Cenomanian.

treptensis Courtinat *in* Courtinat and Gaillard, 1980, p.81-82, pl.6, fig.4,6. Late Oxfordian.

"*velata*" (Deflandre and Cookson, 1955). NOW *Thalassiphora*.

PTERODINIUM Eisenack, 1958, p.395; emend. Yun, 1981, p.12.

agadirense Below, 1981a, p.112-113, pl.3, fig.9. Gargasian.

"*alectrolophum*" (Sarjeant, 1966) Below, 1982d, p.352-353. NOW *Impagidinium*; formerly *Leptodinium*.

**aliferum* Eisenack, 1958, p.395-396, pl.24, fig.6; text-fig.6. Late Aptian.

bab Below, 1981a, p.113, pl.7, fig.10-11; pl.14, fig.9,12-13; text-fig.72-73. Hauterivian.

cingulatum (O. Wetzel, 1933b, p.28, pl.4, fig.10) Below, 1981a, p.114. Senonian. Originally *Cymatiosphaera*; subsequently *Hystrichosphaera*, then *Spiniferites*. See also *Spiniferites cingulatus* subsp. *polygonalis*, *S. crassimuratus* and *S. pterotus* which are *jr synonyms* of this species.

PTERODINIUM cingulatum **(cont'd)**

subsp. *cingulatum* (O. Wetzel, 1933b, p.28, pl.4, fig.10) Below, 1981a, p.114. Senonian. Originally *Cymatiosphaera cingulata;* subsequently *Hystrichosphaera cingulata* var. *cingulata,* then *Spiniferites cingulatus* subsp. *cingulatus.*

subsp. *granulatum* (Clarke and Verdier, 1967, p.45-46, pl.9, fig.5-6) Lentin and Williams, 1981, p.238. Cenomanian. Originally *Hystrichosphaera cingulata* var. *granulata;* subsequently *Spiniferites cingulatus* subsp. *granulatus.*

subsp. *intermedium* (Cookson and Eisenack, 1974, p.64, pl.23, fig.8-9,11) Lentin and Williams, 1981, p.238. Senonian. Originally *Spiniferites cingulatus* var. *intermedius;* subsequently *Spiniferites cingulatus* subsp. *intermedius.*

subsp. *ovale* (Cookson and Eisenack, 1974, p.64, pl.23, fig.12) Lentin and Williams, 1981, p.238. Paleocene. Originally *Spiniferites cingulatus* var. *ovalis;* subsequently *Spiniferites cingulatus* subsp. *ovalis.*

subsp. *reticulatum* (Davey and Williams, 1966a, p.39, pl.1, fig.10; pl.2, fig.4) Lentin and Williams, 1981, p.238. Cenomanian. Originally *Hystrichosphaera cingulata* var. *reticulata;* subsequently *Spiniferites cingulatus* subsp. *reticulatus.* See also *Spiniferites cingulatus* subsp. *perforatus* which is a *jr syn.* of this subspecies.

"circumsutum" (Morgenroth, 1966b). NOW *?Pentadinium.*

"?cornutum" (Cookson and Eisenack, 1962b). NOW *Gonyaulacysta.* Stover and Evitt, 1978, p.183 considered this to be a "provisionally accepted species" of *Pterodinium.*

eisenackii Jain, 1977, p.178, pl.6, fig.73. Early Albian.

"magnoserratum" (Cookson and Eisenack, 1962b). NOW *?Spiniferites.* See also *Gonyaulacysta.*

?makropterus (Cookson and Eisenack, 1982) *comb. nov.*
1982 *Spiniferites makropterus* Cookson and Eisenack, p.47-48, pl.7, fig.1-3. Middle Cretaceous. Because of the uncertainty regarding the morphology of this species, we questionably include it in *Pterodinium.*

mamounium Below, 1981a, p.116-117, pl.7, fig.9; pl.15, fig.14; text-fig.77. Gargasian.

"?perforatum" (Clarke and Verdier, 1967) Davey and Verdier, 1971, p.30-31. NOW *Maghrebinia;* formerly *Dinopterygium.* Stover and Evitt, 1978, p.183 considered this to be a "provisionally accepted species" of *Pterodinium.*

***PTERODINIUM* (cont'd)**

premnon Duxbury, 1980, p.131, pl.3, fig.1-2. Barremian. N.I.A.

?reticulatum Singh, 1971, p.358-359, pl.60, fig.6-7. Middle Albian. Stover and Evitt, 1978, p.183 considered this to be a "provisionally accepted species".

striatum (Clarke and Verdier, 1967, p.31, pl.4, fig.11-13; pl.5, fig.15; text-fig.12) Yun, 1981, p.12. Santonian. Originally *Gonyaulacysta;* subsequently *Leptodinium,* then *Impagidinium.*

"verrucosum" (Brideaux and McIntyre, 1975). NOW *Impagidinium.*

"PYRAMIDIUM" Clarke and Verdier, 1967, p.39. Clarke *et al.*, 1968, p.182 considered this genus to be a *jr syn.* of *Xiphophoridium* Sarjeant. The type and single species of the genus, *Pyramidium alatum,* is now the type of the genus *Xiphophoridium.* Lentin and Williams, 1981, p.238 rejected the contention of Below, 1981a, p.64 that this genus is a *jr syn.* of *"Oodnadattia"* Eisenack and Cookson.

PYXIDIELLA Cookson and Eisenack, 1958, p.51.

**pandora* Cookson and Eisenack, 1958, p.52, pl.6, fig.10-11. Late Jurassic.

"?scrobiculata" (Deflandre and Cookson, 1955) Cookson and Eisenack, 1958, p.52. NOW *Batiacasphaera.* Originally *Leiosphaera;* subsequently *Leiosphaeridia.* See also *Palaeostomocystis.* Stover and Evitt, 1978, p.120 considered this to be a "provisionally accepted species" of *Pyxidiella.*

?simplex Harland, 1979b, p.537-538, pl.3, fig.12-15. Late Miocene. Harland, *op.cit.* questionably included this species in *Pyxidiella.* The transfer of this species to *Tectatodinium* by Edwards, 1984, p.587 is herein rejected because this species does not have the unique wall structure required for that genus. The specimens identified by Edwards, 1984, pl.5, fig.8a-b,10a-b may be a new genus and species.

triangularis Yu Jingxian, 1982, p.257, pl.6, fig.14-16. Late Jurassic-Early Cretaceous.

PYXIDINOPSIS Habib, 1976, p.382.

bakonyensis (Goczan, 1962, p.193-194,200, pl.3, fig.4-10) Stover and Evitt, 1978, p.184. Maastrichtian; formerly *Palaeostomocystis.*

**challengerensis* Habib, 1976, p.382, pl.1, fig.1; pl.3, fig.1-2. Berriasian-Hauterivian.

granulata (Ioannides *et al.*, 1977) *comb. nov.*
1977 *Tapeinosphaeridium granulatum* Ioannides *et al.*, p.462, pl.4, fig.18-19. Kimmeridgian; also formerly *?Tectatodinium.* The wall structure of *Pyxidinopsis granulata* precludes the assignment of this species to *Tectatodinium.*

PYXIDINOPSIS (cont'd)

laminata (Davies, 1983) *comb. nov.*
1983 *Tectatodinium laminatum* Davies, p.21, pl.6, fig.1-5,21; text-fig.16.
Late Oxfordian-Tithonian.

Q

QUADRINA Bujak *in* Bujak *et al.*, 1980, p.90. Bujak, *op.cit.* considered this to be an acritarch.

**pallida* Bujak *in* Bujak *et al.*, 1980, p.90-91, pl.22, fig.9-11. Late Eocene.

QUINQUECUSPIS Harland, 1977b, p.106; emend. Harland, 1982a, p.396-397. Harland, 1982a, p.396 designated *Quinquecuspis* as a section of the subgenus *Protoperidinium* (Berg) Balech, 1974.

**concreta* (Reid, 1977, p.438-439, pl.1, fig.9-11) Harland, 1977b, p.107. Recent; formerly *Trinovantedinium*. Harland, 1981, p.68 and Lewis *et al.*, 1984, p.30 considered this species to represent the encysted stage of *Protoperidinium leonis* (Pavillard) Balech, 1974.

R

RAPHIDODINIUM Deflandre, 1936b, p.184-185; emend. Sarjeant and Downie, 1982, p. 116-117.

**fucatum* Deflandre, 1936b, p.185-186, pl.10, fig.1-7; emend. Sarjeant and Downie, 1982, p.117-118. ?Senonian.

RENIDINIUM Morgenroth, 1968, p.551-552.

**membraniferum* Morgenroth, 1968, p.552-553, pl.46, fig.9; pl.47, fig.1-3. Danian.

vitilare (Cookson, 1965b, p.138-139, pl.24, fig.1-7) Stover and Evitt, 1978, p.79. Paleocene; formerly *Cyclonephelium*.

RETICULATOSPHAERA Matsuoka, 1983b, p.116.

**stellata* Matsuoka, 1983b, p.116-117, pl.4, fig.8-11; text-fig.10. Pliocene or younger.

REUTLINGIA Drugg, 1978, p.72.

**gochtii* Drugg, 1978, p.72-73, pl.7, fig.7-10. Callovian.

RHAETOGONYAULAX Sarjeant, 1966b, p.152-153; emend. Harland *et al.*, 1975, p.860; emend. Fisher and van Helden, 1979, p.270,272. See also *Shublikodinium* which is a *jr syn.* of this genus.

arctica (Wiggins, 1973, p.4, pl.1, fig.1-4; pl.2, fig.1-9; text-fig.2a-d) Stover and Evitt, 1978, p.219. Late Triassic; formerly *Shublikodinium*.

subsp. *maculata* (Wiggins, 1973, p.4-5, pl.2, fig.10-12) Stover and Evitt, 1978, p.219. Late Triassic. Originally *Shublikodinium arcticum* var. *maculatum;* subsequently *Shublikodinium arcticum* subsp. *maculatum*.

"chaloneri" (Sarjeant, 1963b, p.354; text-fig.2(right);3) Sarjeant, 1969, p.15. NOW *Rhaetogonyaulax rhaetica* subsp. *chaloneri;* formerly *Gonyaulax*. Harland *et al.*, 1975, p.863 considered this species to be a variety of *Rhaetogonyaulax rhaetica*.

dilatata (Wiggins, 1973, p.6, pl.5, fig.3-4) Stover and Evitt, 1978, p.219. Late Triassic; formerly *Shublikodinium*.

RHAETOGONYAULAX (cont'd)

**rhaetica* (Sarjeant, 1963b, p.353; text-fig.1-2(left)) Loeblich and Loeblich, 1968, p.212; emend. Harland *et al.*, 1975, p.862. Late Triassic; formerly *Gonyaulax*.

subsp. *chaloneri* (Sarjeant, 1963b, p.354, text-fig.2(right);3) Lentin and Williams, 1977b, p.138. Late Triassic. Originally *Gonyaulax chaloneri;* subsequently *Rhaetogonyaulax chaloneri*. This taxon was transferred to *Rhaetogonyaulax* by Sarjeant, 1969, p.15. Subsequently Harland *et al.*, 1975, p.863 redesignated it as a variety of *Rhaetogonyaulax rhaetica*. Lentin and Williams, 1977b, p.138 raised it to the subspecies level.

testacea Fisher and van Helden, 1979, p.272, pl.1, fig.1-6; text-fig.1E. Middle Norian-Rhaetian.

tortuosa Fisher and van Helden, 1979, p.274,276, pl.2, fig.7; pl.3, fig.2,6-7; pl.4, fig.1-8. Karnian-Rhaetian.

uncinata Fisher and van Helden, 1979, p.274, pl.2, fig.3-8; pl.3, fig.1,3-5. Middle Norian-Rhaetian.

RHIPTOCORYS Lejeune-Carpentier and Sarjeant, 1983, p.5.

**veligera* (Deflandre, 1937b, p.81, pl.12, fig.9) Lejeune-Carpentier and Sarjeant, 1983, p.5. Senonian. Originally *Micrhystridium;* subsequently *Ceratocorys,* then *Microdinium*. This species was emended by Lejeune-Carpentier and Sarjeant, 1983, p.5-6.

RHOMBODELLA Cookson and Eisenack, 1962b, p.496; emend. Jiabo, 1978, p.49. Stover and Evitt, 1978, p.70-71 considered this genus to be a *jr syn.* of *Palaeotetradinium*. Accordingly they transferred the type of the genus, *R. natans,* to *Palaeotetradinium* as a *jr syn.* of *Palaeohystrichophora paucispina* Alberti, 1961, which they also transferred to *Palaeotetradinium*. Although they agreed that *R. natans* and *P. paucispina* are conspecific, the inclusion of these distinctive Aptian-Albian forms in *Palaeotetradinium* was rejected by Lentin and Williams, 1981, p.242, who retained the genus *Rhombodella*. Duxbury, 1980, p.134-135 also believed that *Rhombodella* was a separate and distinctive genus which is characterized by having four groups of processes at the "corners". However, Duxbury, *op.cit.* believed that *Rhombodella* was an acritarch.

baculata Jiabo, 1978, p.49, pl.24, fig.14-15. Early Tertiary.

bifurcata Jiabo, 1978, p.50, pl.24, fig.16-17. Early Tertiary.

"kendelbachia" (Morbey, 1975). NOW *Heibergella*.

"natans" Cookson and Eisenack, 1962b, p.496, pl.7, fig.12-13. Aptian-Albian. *Jr syn.* of *R. paucispina* according to Stover and Evitt, 1978, p.71.

***RHOMBODELLA* (cont'd)**

**paucispina* (Alberti, 1961, p.19-20, pl.3, fig.25) Duxbury, 1980, p.136. Albian; formerly *Palaeohystrichophora.* The transfer of this species to *Palaeotetradinium* by Stover and Evitt, 1978, p.71 was rejected by Lentin and Williams, 1981, p.242. The original type of the genus *Rhombodella, R. natans* Cookson and Eisenack, is considered to be a *jr syn.* of *R. paucispina* by Stover and Evitt, 1978, p.71.

tubiforma Jiabo, 1978, p.50, pl.24, fig.12-13. Early Tertiary.

variabilis Jiabo, 1978, p.50, pl.24, fig.7-11. Early Tertiary.

vesca Duxbury, 1980, p.135-136, pl.5, fig.7,10; text-fig.16. Barremian.

RHOMBODINIUM Gocht, 1955, p.85; emend. Bujak, 1979, p.313-314. This genus was lowered to the subgeneric rank within the genus *Wetzeliella* by Alberti, 1961, p.9. Vozzhennikova, 1967, p.167-168 maintained it at the genus level. Harker and Sarjeant, 1975, p.225 again designated *Rhombodinium* as a subgenus of *Wetzeliella* Eisenack. *Rhombodinium* was retained at the generic level by Lentin and Williams, 1977b, p.139.

"condylos" (Williams and Downie) Lentin and Williams, 1976, p.128. NOW *Dracodinium;* formerly *Wetzeliella.* N.I.A.

"coronatum" (Vozzhennikova, 1967). Was *Wetzeliella coronata.* Costa and Downie, 1979, p.43 considered this species to be a *jr syn.* of *Wetzeliella articulata.* For full citation see *Wetzeliella coronata.*

**draco* Gocht, 1955, p.86, text-fig.1. Middle Oligocene. See also *Wetzeliella.*

subsp. *"freienwaldense"* (Gocht, 1955) Lentin and Williams, 1973, p.120. NOW *Rhombodinium freienwaldense;* formerly *Rhombodinium draco* forma *freienwaldensis.*

freienwaldense (Gocht, 1955, p.87; text-fig.2) Costa and Downie, 1979, p.44. Middle Oligocene. Originally *Rhombodinium draco* forma *freienwaldensis;* subsequently *Rhombodinium draco* subsp. *freienwaldense.* See also *Rhombodinium rotundatum* which is a *jr syn.* of this species.

glabrum (Cookson, 1956, p.186, pl.2, fig.1-5) Vozzhennikova, 1967, p.169. Eocene; formerly *Wetzeliella.* The transfer of this species to *Wilsonidium* by Costa and Downie, 1979, p.45 was rejected by Lentin and Williams, 1981, p.243.

subsp. *crassithecum* (Vozzhennikova, 1967, p.170, pl.91, fig.1-2,4-6) Lentin and Williams, 1973, p.120. Late Eocene-Early Oligocene; formerly *Rhombodinium glabrum* forma *crassitheca.*

***RHOMBODINIUM glabrum* (cont'd)**

subsp. *"granulatum"* (Wilson, 1967c) Lentin and Williams, 1973, p.120. NOW *Dracodinium granulatum;* formerly *Wetzeliella (Rhombodinium) glabra* var. *granulata.*

"intermedium" (Cookson and Eisenack, 1961b) Lentin and Williams, 1973, p.120. NOW *Wilsonidium;* formerly *Wetzeliella.*

longimanum Vozzhennikova, 1967, p.171, pl.92, fig.1-3; pl.93, fig.1-6; pl.94, fig.1-3. Late Eocene.

?majus Yu Jingxian, 1982, p.257, pl.8, fig.8. Late Jurassic-Early Cretaceous. From the single illustration, it is difficult to verify the generic assignment of this species; accordingly, we questionably include it in *Rhombodinium.*

"?minusculum" (Alberti, 1961) Lentin and Williams, 1973, p.120. NOW *Palaeotetradinium;* formerly *Wetzeliella (Rhombodinium) minuscula.* Lentin and Williams, 1976, p.128 provisionally included this species in *Rhombodinium.* McLean, 1973b, p.732 hypothesized that this species may belong to the genus *Inversidinium* McLean. The transfer of this species to *Inversidinium* by Costa and Downie, 1979, p.44 was rejected by Lentin and Williams, 1981, p.243.

oravense Grigorovich, 1971, p.94, pl.2, fig.6. Eocene.

"?ornatum" (Wilson, 1967c) Stover and Evitt, 1978, p.121. Stover and Evitt, *op.cit.* considered this to be a "provisionally accepted species" of *Rhombodinium.* The transfer of this species from *Wilsonidium* to *Rhombodinium* was rejected by Lentin and Williams, 1981, p.244.

pentagonum Vozzhennikova, 1967, p.171-172, pl.89, fig.4; pl.95, fig.1-5; pl.96, fig.1-6. Late Eocene-Early Oligocene. The transfer of this species to the genus *Wetzeliella* was rejected by Stover and Evitt, 1978, p.121. In view of the nature of the archeopyle and ornamentation, Lentin and Williams, 1981, p.244 did not agree with Costa and Downie, 1979, p.40 that *R. pentagonum* is a *jr syn.* of *Wetzeliella articulata.*

perforatum (Jan du Chêne and Châteauneuf, 1975, p.30-31, pl.1, fig.8-14; pl.3, fig.7-10) Lentin and Williams, 1977b, p.139. Middle Eocene (Lutetian); formerly *Wetzeliella (Rhombodinium) perforata.*

porosum Bujak, 1979, p.314-315, pl.1, fig.3,5-8; pl.2, fig.11; text-fig.8C. Late Eocene.

pustulosum Châteauneuf, 1980, p.150, pl.29, fig.5-7,10. Late Eocene (Auversian).

"rhomboideum" (Alberti, 1961) Lentin and Williams, 1973, p.121. NOW *Dracodinium;* formerly *Wetzeliella (Rhombodinium).*

RHOMBODINIUM **(cont'd)**

"rotundatum" Baltes, 1969, p.35, pl.5, fig.10 *ex* Lentin and Williams, 1973, p.121. Oligocene; formerly *Wetzeliella rotundata* (provisional designation). *Jr syn.* of *Rhombodinium freienwaldense* according to Costa and Downie, 1979, p.44.

vialovii Oleinik, 1976a, p.85-86, pl.1, fig.7-9. Late Eocene.

"waipawaense" (Wilson, 1967c) Lentin and Williams, 1973, p.121. NOW *Dracodinium;* formerly *Wetzeliella (Rhombodinium)*.

RHYNCHODINIOPSIS Deflandre, 1935, p.231; emend. Sarjeant, 1982, p.34-35. Lentin and Williams, 1981, p.244 rejected the emendation of this genus by Below, 1981a, p.117. The transfer of the type species, *R. aptiana,* to *Gonyaulacysta* by Millioud, 1969, p.428 was not noted in previous copies of the index. However, the transfer has not found general acceptance.

**aptiana* Deflandre, 1935, p.231, pl.5, fig.10; pl.8, fig.7-10; emend. Sarjeant, 1982, p.36-37. Senonian. See *Gonyaulacysta.* See also *Rhynchodiniopsis fimbriata* which is a *jr syn.* of this species.

"?bacculata" (Baltes, 1971) Sarjeant, 1982, p.36. NOW and originally *Leptodinium;* subsequently *Millioudodinium.* Sarjeant, *op.cit.* considered this to be a "provisionally accepted species" of *Rhynchodiniopsis.*

"cauda" (Gitmez and Sarjeant, 1972, p.193-194) Sarjeant, 1982, p.35. NOW *Cribroperidinium.* Originally *Gonyaulacysta;* subsequently *Millioudodinium,* then *Rhynchodiniopsis.*

"cladophora" (Deflandre, 1938b) Below, 1981a, p.118. Lentin and Williams, 1981, p.244 rejected this transfer and retained the species and all its subspecies in *Hystrichogonyaulax.*

?confusa (Vozzhennikova, 1967, p.80, pl.17, fig.1a-b; pl.25, fig.4-5; pl.27, fig. 3-4) Sarjeant, 1982, p.36. Late Jurassic. Sarjeant, *op.cit.* considered this to be a "provisionally accepted species" of *Rhynchodiniopsis.* Originally *Gonyaulax;* subsequently *Gonyaulacysta,* then *?Millioudodinium.* See also *Apteodinium.*

crassicornuta (Klement, 1960, p.38, pl.5, fig.1) Below, 1981a, p.118; emend. Sarjeant, 1984a, p.158-160. Early Kimmeridgian. Originally *Gonyaulax;* subsequently *?Gonyaulacysta.* Lentin and Williams, 1981, p.244 rejected the transfer of this species from *?Gonyaulacysta* to *Rhynchodiniopsis.* Sarjeant, 1984, p.34-35 emended the diagnosis of *Rhynchodiniopsis* and retained the species in this genus.

RHYNCHODINIOPSIS **(cont'd)**

"?downiei" (Pocock, 1972) Sarjeant, 1982, p.36. Sarjeant, *op.cit.*, p.36 considered this to be a "provisionally accepted species" of *Rhynchodiniopsis.* Since Fisher and Riley, 1980, p.320 considered this species to be a *jr syn.* of *Hystrichogonyaulax cladophora* (Deflandre) Stover and Evitt, the transfer to *?Rhynchodiniopsis* by Sarjeant, 1982, was unnecessary. See also *Gonyaulacysta downiei* and *Hystrichosphaeropsis downiei.*

"episoma" (Sarjeant, 1966b) Sarjeant, 1982, p.35. NOW *Leptodinium.* Originally *Gonyaulacysta;* subsequently *Millioudodinium.*

"fimbriata" (Duxbury, 1980, p.123, pl.1, fig.1-3) Sarjeant, 1982, p.35. Barremian; formerly *Gonyaulacysta.* Below, 1981a, p.118 considered this species to be a *jr syn.* of *Rhynchodiniopsis aptiana.*

"?giuseppei" (Morgenroth, 1966a) Sarjeant, 1982, p.36. NOW *Cribroperidinium.* Sarjeant, *op.cit.* considered this to be a "provisionally accepted species" of *Rhynchodiniopsis.* We accept the opinion of Helenes, 1984, p.121 who included this species in *Cribroperidinium.*

subsp. *"major"* (Morgenroth, 1966a) Sarjeant, 1982, p.36. NOW *Cribroperidinium giuseppei.* In view of the findings of Helenes, 1984, p.121 concerning the species *Cribroperidinium giuseppei,* we herein reject the above transfer, preferring to consider this subspecies a synonym of *Cribroperidinivm giuseppei.*

"globata" (Gitmez and Sarjeant, 1972) Sarjeant, 1982, p.35. NOW *Cribroperidinium.* Originally *Gonyaulacysta;* subsequently *Millioudodinium.*

gongyla (Sarjeant, 1966b, p.111-113, pl.13, fig.1-2; text-fig.23) Sarjeant, 1982, p.35. Early Oxfordian. Originally *Gonyaulacysta;* subsequently *?Leptodinium.*

"granulata" (Klement, 1960) Sarjeant, 1982, p.35. NOW *Meristaulax.* Originally *Gonyaulax;* subsequently *Gonyaulacysta;* then *Cribroperidinium.* We herein reject the opinion of Helenes, 1984, p.122, who retained this species in *Cribroperidinium.*

"granuligera" (Klement, 1960) Sarjeant, 1982, p.35. NOW *Cribroperidinium.* See also *Gonyaulax, Gonyaulacysta* and *Cryptarchaeodinium.*

"hadra" (Sarjeant, 1966b) Sarjeant, 1982, p.35. NOW *?Leptodinium.* Originally *Gonyaulacysta;* subsequently *Millioudodinium.*

?hyaloderma (Deflandre, 1939, p.144, pl.6, fig.3-4) Sarjeant, 1982, p.36. Kimmeridgian. Sarjeant, *op.cit.* considered this to be a "provisionally accepted species" of *Rhynchodiniopsis.* Originally *Palaeoperidinium;* subsequently *Gonyaulacysta.*

RHYNCHODINIOPSIS (cont'd)

hyalodermopsis (Cookson and Eisenack, 1958, p.34, pl.3, fig.11-12; text-fig.5-6) Sarjeant, 1982, p.35. Neocomian-Aptian. Originally *Gonyaulax;* subsequently *Gonyaulacysta,* then *?Leptodinium.*

"?mamillifera" (Deflandre, 1939) Sarjeant, 1982, p.36. NOW *Leptodinium.* At the time of the transfer, Sarjeant, *op.cit.* considered this species to be a "provisionally accepted species" of *Rhynchodiniopsis.* Originally *Gonyaulax;* subsequently *Gonyaulacysta,* then *?Millioudodinium.*

?nannotrix (Deflandre, 1939, p.143, pl.6, fig.7) Sarjeant, 1982, p.36. Kimmeridgian. At the time of the transfer, Sarjeant, *op.cit.* considered this species to be a "provisionally accepted species" of *Rhynchodiniopsis.* Originally *Gonyaulax;* subsequently *Gonyaulacysta.*

"obesa" (Brideaux, 1971) Sarjeant, 1982, p.35. NOW *?Cribroperidinium.* Originally *Gonyaulacysta;* subsequently *Millioudodinium.*

"palla" (Sarjeant, 1966b) Sarjeant, 1982, p.35. NOW *Cribroperidinium.* Originally *Gonyaulacysta;* subsequently *Millioudodinium.*

"perforans" (Cookson and Eisenack, 1958) Sarjeant, 1982, p.35. NOW *?Cribroperidinium.* Originally *Gonyaulax;* subsequently *Gonyaulacysta,* then *?Leptodinium.*

"sarjeantii" (Vozzhennikova, 1967) Sarjeant, 1982, p.35. NOW *?Cribroperidinium.* Originally *Gonyaulax;* subsequently *Gonyaulacysta,* then *Millioudodinium.*

subsp. *"sphaerica"* (Vozzhennikova, 1967) Sarjeant, 1982, p.35. NOW *?Cribroperidinium sarjeantii* subsp. *sphaericum.* Originally *Gonyaulax sarjeanti* var. *sphaericum;* subsequently *Gonyaulacysta sarjeantii* subsp. *sphaerica,* then *Millioudodinium sarjeantii* subsp. *sphaericum.*

setcheyensis (Sarjeant, 1976c, p.4-6, pl.1, fig.7; text-fig.1) Sarjeant, 1982, p.36. Kimmeridgian. Originally *Gonyaulacysta;* subsequently *Leptodinium.*

"tenuitabulata" (Gerlach, 1961) Sarjeant, 1984b, p.76. We herein reject this transfer and retain the species in *Cribroperidinium.*

whitei (Sarjeant, 1966b, p.126-128, pl.14, fig.2; text-fig.32) Sarjeant, 1982, p.36. Cenomanian. Originally *Gonyaulacysta;* subsequently *?Impagidinium.*

RICULACYSTA Stover, 1977, p.76-77.

**perforata* Stover, 1977, p.77-78, pl.2, fig.22-31. Middle-Late Oligocene.

RIGAUDELLA Below, 1982b, p.138-139.

**aemula* (Deflandre, 1938b, p.187-189, pl.9, fig.12; pl.10, fig.5-8; pl.11, fig.1-7) Below, 1982b, p.139-140,143-144,146. Oxfordian. Originally *Hystrichosphaeridium;* subsequently *Cannosphaeropsis,* then *Adnatosphaeridium.* See also *Adnatosphaeridium paucispinum* which is a *jr syn.* of this species.

subsp. *integra* (Cookson and Eisenack, 1958, p.47, pl.7, fig.6-7) Below, 1982b, p.147. Late Jurassic. Originally *Cannosphaeropsis aemula* subsp. *integra;* subsequently *Adnatosphaeridium aemulum* subsp. *integrum.*

apenninica (Corradini, 1973, p.163-164, pl.25, fig.4; pl.36, fig.1a-b) Below, 1982b, p.148. Late Cretaceous-Paleocene; formerly *Adnatosphaeridium.*

apiculata (Cookson and Eisenack, 1960b, p.254, pl.39, fig.15) Below, 1982b, p.148. Probably Tithonian. Originally *Cannosphaeropsis;* subsequently *Adnatosphaeridium.*

filamentosa (Cookson and Eisenack, 1958, p.47, pl.7, fig.8-9; pl.8, fig.1-3) Below, 1982b, p.148. Middle-Late Jurassic. Originally *Cannosphaeropsis;* subsequently *Adnatosphaeridium.*

perforata (Alberti, 1961, p.37, pl.9, fig.14) Below, 1982b, p.149. ?Callovian. Originally *Cannosphaeropsis;* subsequently *Adnatosphaeridium.*

"RIVERNOOKIA" Cookson and Eisenack, 1982, p.56. By retaining the type and single species of the genus *Rivernookia, "R. septata"*, in *Hafniasphaera,* we make *Rivernookia* a *jr syn.* of *Hafniasphaera.*

*"*septata"* (Cookson and Eisenack, 1967b) Cookson and Eisenack, 1982, p.56. We herein reject this transfer, retaining the species in *Hafniasphaera.*

ROMANODINIUM Baltes, 1971, p.8-9.

**areolatum* Baltes, 1971, p.9, pl.3, fig.1-2. Early Pliocene.

ROTTNESTIA Cookson and Eisenack, 1961b, p.40,42. Yun, 1981, p.22 considered this genus to be a *jr syn.* of the genus *Triblastula* O. Wetzel.

amphicavata Dobell and Norris *in* Harland *et al.*, 1980, p.218-220, text-fig.4A-N,5-7. Sub-Recent.

**borussica* (Eisenack, 1954, p.62, pl.9, fig.5-7) Cookson and Eisenack, 1961b, p.42. Early Oligocene. Originally *Hystrichosphaera;* subsequently *Hystrichosphaeropsis.* The transfer to *Triblastula* by Morgenroth, 1966a, p.15-16 was rejected by Eisenack, 1969, p.105-108.

"simplicia" (Cookson and Eisenack, 1961b). NOW *?Impagidinium;* also formerly *Psaligonyaulax.*

S

SAEPTODINIUM Harris, 1974, p.162.

eurypylum (Manum and Cookson, 1964, p.20-21, pl.4, fig.7-13) Stover and Evitt, 1978, p.220. Late Cretaceous. Originally *Scriniodinium;* subsequently *Palaeoperidinium.*

**gravattense* Harris, 1974, p.162-163, pl.1, fig.1-4. Paleocene.

hansonianum (Traverse, 1955, p.77-79, pl.13, fig.147; emend. Evitt, 1974, p.2-3) Stover and Evitt, 1978, p.220. Late Oligocene. Originally *Peridinium;* subsequently *Palaeoperidinium.* According to Art. 33, para. 4 of the I.C.B.N., transfer of *"Palaeoperidinium hansonianum"* (Traverse) Lentin and Williams, to *Saeptodinium* by Harris, 1974 is invalid.

tasmaniense Harris, 1974, p.163, pl.1, fig.12; pl.2, fig.1-6. Late Oligocene-Early Miocene.

tiandongense He Cheng-quan and Qian Ze-shu, 1979, p.177, pl.1, fig.6-7a-b. Late Eocene-Oligocene.

SAMLANDIA Eisenack, 1954, p.76. See also *Palmnickia* which is a *jr syn.* of this genus.

?angustivela (Deflandre and Cookson, 1955, p.290, pl.7, fig.4-5) Eisenack, 1963a, p.102. Eocene; formerly *Membranilarnax.* Stover and Evitt, 1978, p.186 considered this to be a "provisionally accepted species".

"californica" (Drugg, 1967) Lentin and Williams, 1977b, p.141. NOW *Danea.*

**chlamydophora* Eisenack, 1954, p.76, pl.11, fig.12-15. Early Oligocene. See also *Palmnickia lobifera* which is a *jr syn.* of this species.

reticulifera Cookson and Eisenack, 1965a, p.126-127, pl.15, fig.10-15. Late Eocene.

SANSHUIA Yu Jingxian *et al.,* 1981, p.259.

dalangshanensis Yu Jingxian *et al.,* 1981, p.259, pl.1, fig.7-10,15-16. Late Cretaceous.

SANSHUIA (cont'd)

fibrirugularis Yu Jingxian *et al.*, 1981, p.260, pl.1, fig.11-12. Late Cretaceous.

micropoda Yu Jingxian *et al.*, 1981, p.259-260, pl.1, fig.3-4. Late Cretaceous.

minor Yu Jingxian *et al.*, 1981, p.260, pl.1, fig.13-14. Late Cretaceous.

minuta (Jiabo, 1978) *comb. nov.*
1978 *Deflandrea minuta* Jiabo, p.83, pl.3, fig.10-11. Early Tertiary. Yu Jingxian *et al.*, 1981, p.260 failed to give a proper citation when they transferred this species to *Sanshuia.*

ovata (Jiabo, 1978) *comb. nov.*
1978 *Deflandrea ovata* Jiabo, p.84, pl.4, fig.1-3. Early Tertiary. Yu Jingxian *et al.*, 1981, p.260 failed to give a proper citation when they transferred this species to *Sanshuia.* See also *Subtilisphaera.*

**sphaerica* Yu Jingxian *et al.*, 1981, p.259, pl.1, fig.1-2,6. Late Cretaceous.

"SARJEANTIA" Horowitz, 1975, p.25; emend. Fensome and Sarjeant, 1982, p.51,53. Conway and Cousminer, 1983, p.35 considered the type and single species of the genus *Sarjeantia, S. triassica,* to be a *jr syn.* of the monolete spore *Aratrisporites fimbriatus* Playford and Dettmann.

"**triassica*" Horowitz, 1975, p.25, pl.1, fig.7; emend. Fensome and Sarjeant, 1982, p.53-54. Late Triassic. Re-examination of the type material by Fensome and Sarjeant, 1982, indicated that the age of the type material is Late Bathonian. *Jr syn.* of the monolete spore *Aratrisporites fimbriatus* Playford and Dettmann acoording to Conway and Cousminer, 1983, p.35, fig.1a-f (holotype). See discussion under the genus *Sarjeantia.*

SCHEMATOPHORA Deflandre and Cookson, 1955, p.262.

**speciosa* Deflandre and Cookson, 1955, p.262-263, pl.6, fig.11-13; pl.7, fig.11; emend. Stover, 1975, p.39. Eocene-Miocene.

SCHIZOCYSTIA Cookson and Eisenack, 1962a, p.270. Stover and Evitt, 1978, p.297 considered this to be an acritarch genus.

laevigata Cookson and Eisenack, 1962a, p.270-271, pl.37, fig.13-14. ?Late Albian-Cenomanian.

**rugosa* Cookson and Eisenack, 1962a, p.270, pl.37, fig.11-12. ?Late Albian-Cenomanian.

SCRINIOCASSIS Gocht, 1964, p.121.

dictyota (Cookson and Eisenack, 1960b, p.248-249, pl.37, fig.8-9) Beju, 1971, p.299. Oxfordian-Tithonian; formerly *Scriniodinium*. O.C. The transfer of this species to *Aldorfia* by Davey, 1982b, p.25 is herein rejected.

subsp. *dictyota* (Cookson and Eisenack, 1960b, p.248-249, pl.37, fig.8-9) Beju, 1971, p.299. Oxfordian-Tithonian; formerly *Scriniodinium dictyotum* subsp. *dictyotum*. O.C.

subsp. *"osmingtonensis"* (Gitmez, 1970, p.310-311, pl.1, fig.3; pl.8, fig. 12) Lentin and Williams, 1975, p.2154. Early Kimmeridgian; formerly *Scriniodinium dictyotum* subsp. *osmingtonense*. Davies, 1983, p.24 considered this subspecies to be a *jr syn*. of *Scriniocassis weberi*. O.C.

subsp. *"papillata"* (Gitmez, 1970) Lentin and Williams, 1975, p.2154. NOW *Scriniocassis papillata;* formerly *Scriniodinium dictyotum* subsp. *papillatum*. O.C.

subsp. *"pirum"* (Gitmez, 1970) Lentin and Williams, 1975, p.2154. NOW *Scriniocassis pirum;* formerly *Scriniodinium dictyotum* subsp. *pirum*. O.C. N.I.A.

papillata (Gitmez, 1970, p.311, pl.9, fig.11) Davies, 1983, p.24. Early Kimmeridgian. Originally *Scriniodinium dictyotum* subsp. *papillatum;* subsequently *Scriniocassis dictyota* subsp. *papillata*.

pirum (Gitmez, 1970, p.311,313, pl.10, fig.1; pl.13, fig.1-2; text-fig.33a-b) Davies, 1983, p.24. Early Kimmeridgian. Originally *Scriniodinium dictyotum* subsp. *pirum;* subsequently *Scriniocassis dictyota* subsp. *pirum*.

**weberi* Gocht, 1964, p.121, pl.17, fig.1-4; text-fig.39. Late Toarcian-Early Bajocian. See also *Scriniocassis dictyota* subsp. *osmingtonensis* which is a *jr syn*. of this species.

SCRINIODINIUM Klement, 1957, p.409-410. See also *Endoscrinium*.

"amalthei" (W. Wetzel, 1966) Sarjeant, 1980b, p.117. NOW *Endoscrinium;* formerly *?Membranilarnacia*. The species was emended by Sarjeant, *op. cit*. at the time of the transfer.

"apatelum" (Cookson and Eisenack, 1960b). NOW *Tubotuberella*.

attadalense (Cookson and Eisenack, 1958, p.25, pl.1, fig.7) Eisenack, 1967, p.193 (748a). Aptian; formerly *Gymnodinium*.

"australiense" (Deflandre and Cookson, 1955) Eisenack, 1967, p.195 (748b). NOW *Apteodinium;* formerly *Gymnodinium*. This species was invalidly transferred to *Emslandia* by Nagy, 1965, p.202.

SCRINIODINIUM **(cont'd)**

"bicuneatum" (Deflandre, 1938b) Gitmez, 1970, p.308. NOW *Dinopterygium*; formerly *Palaeoperidinium*.

"?campanula" (Gocht, 1959). NOW *Endoscrinium*. The retention of this species in *?Scriniodinium* by Stover and Evitt, 1978, p.187 was rejected by Lentin and Williams, 1981, p.96. Stover and Evitt, *op.cit.* considered this to be a "provisionally accepted species" of *Scriniodinium*.

?ceratophorum Cookson and Eisenack, 1960b, p.249, pl.37, fig.7. Oxfordian-Early Kimmeridgian. Stover and Evitt, 1978, p.187 considered this to be a "provisionally accepted species".

"cooksoniae" Anderson, 1960, p.30, pl.9, fig.1-3. *Jr syn.* of *Subtilisphaera* (as *Deflandrea) pirnaensis* according to Sarjeant and Anderson, 1969, p.232-233.

**crystallinum* (Deflandre, 1938b, p.165, pl.5, fig.1-3) Klement, 1960, p.18. Oxfordian; formerly *Gymnodinium*.

"dictyotum" (Cookson and Eisenack, 1960b). NOW *Scriniocassis*.

subsp. *"dictyotum"* (Cookson and Eisenack, 1960b). NOW *Scriniocassis dictyota* subsp. *dictyota*.

subsp. *"osmingtonense"* (Gitmez, 1970). See *Scriniocassis dictyota* subsp. *osmingtonensis*.

subsp. *"papillatum"* (Gitmez, 1970). NOW *Scriniocassis papillata*. See also *Scriniocassis dictyota* subsp. *papillata*.

subsp. *"pirum"* (Gitmez, 1970). NOW *Scriniocassis pirum*. See also *Scriniocassis dictyota* subsp. *pirum*.

"eurypylum" (Manum and Cookson, 1964). NOW *Saeptodinium*.

"galeatum" (Cookson and Eisenack, 1960a). NOW *Hystrichosphaeropsis*.

"galeritum" (Deflandre, 1938b) Klement, 1960, p.22. NOW *Endoscrinium*; formerly *Gymnodinium*. The retention of this species in *Scriniodinium* by Stover and Evitt, 1978, p.187 was rejected by Lentin and Williams, 1981, p.96.

subsp. *"fornicatum"* (Klement, 1960). NOW *Endoscrinium galeritum* subsp. *fornicatum*.

subsp. *"reticulatum"* (Klement, 1960). NOW *Endoscrinium galeritum* subsp. *reticulatum*.

SCRINIODINIUM (cont'd)

?globosum Olaru, 1978, p.86, pl.12, fig.13. Late Eocene.

"?gochtii" (Pocock, 1972). NOW *Endoscrinium*. Stover and Evitt 1978, p.187 considered this to be a "provisionally accepted species" of *Scriniodinium*.

heusseri Habib, 1970, p.366-368, pl.8, fig.4. Albian-Cenomanian.

inritibilum Riley *in* Fisher and Riley, 1980, p.322-323, pl.2, fig.7,9.

"?irisae" (Kjellström, 1973). NOW *Hystrichosphaeropsis*. Kjellström, *op.cit.*, p.40 questionably included this species in *Scriniodinium*.

"?irregulare" (Cookson and Eisenack, 1958) Stover and Evitt, 1978, p.188. NOW *Tubotuberella;* formerly *Wetzeliella*. Stover and Evitt, 1978, p.188 considered this to be a "provisionally accepted species" of *Scriniodinium*.

"?klementii" (Pocock, 1972). NOW *Endoscrinium*. Stover and Evitt, 1978, p.188 considered this to be a "provisionally accepted species" of *Scriniodinium*.

"luridum" (Deflandre, 1938b) Klement, 1960, p.20. NOW *Tubotuberella*.

?nilsii Kjellström, 1973, p.42, fig.35. Middle-Late Maastrichtian. Kjellström, *op.cit.* questionably included this species in *Scriniodinium*. Stover and Evitt, 1978, p.188 considered this to be a "problematical species", suggesting it may be *Paralecaniella indentata*.

?novissimum Morgenroth, 1968, p.540-541, pl.43, fig.3-4. Danian. Stover and Evitt, 1978, p.188 considered this to be a "provisionally accepted species".

?obscurum Manum and Cookson, 1964, p.21-22, pl.4, fig.5-6. Late Cretaceous. Stover and Evitt, 1978, p.188 considered this to be a "provisionally accepted species".

"oxfordianum" (Sarjeant, 1962a). NOW *Sirmiodinium*.

parvimarginatum (Cookson and Eisenack, 1958, p.24, pl.1, fig.6) Eisenack, 1967, p.201 (770a). Late Jurassic; formerly *Gymnodinium*.

"pharo" (Duxbury, 1977) Davey, 1982b, p.31. NOW and formerly *Endoscrinium*.

playfordii Cookson and Eisenack, 1960b, p.248, pl.37, fig.6. Oxfordian-Tithonian. O.C.

"pontianum" (Baltes, 1969 *ex* Lentin and Williams, 1973). NOW *Hystrichosphaeropsis*.

SCRINIODINIUM **(cont'd)**

"pseudocrystallinum" Beju, 1971, p.295-297, pl.7, fig.1-3; text-fig.7. Oxfordian-Kimmeridgian. Drugg, 1978, p.73 considered this species to be a *jr syn.* of *Sirmiodinium grossii* Alberti.

?reticulatum Pocock, 1972, p.91-92, pl.23, fig.3. Callovian. Stover and Evitt, 1978, p.188 considered this to be a "provisionally accepted species".

"rostratum" (Brideaux and McIntyre, 1975). NOW *Endoscrinium.*

scutellum Eisenack, 1958, p.385, pl.24, fig.3. Late Aptian.

"subvallare" (Sarjeant, 1962b). NOW *Endoscrinium.* The retention of this species in *Scriniodinium* by Stover and Evitt, 1978, p.187 was rejected by Lentin and Williams, 1981, p.97.

?torulosum (Deflandre, 1943, p.504, pl.17, fig.7-8; text-fig.17-25) Lentin and Williams, 1973, p.124. Senonian; formerly *Gymnodinium.* Lentin and Williams, *op.cit.* questionably assigned this species to *Scriniodinium* since, according to Evitt (personal communication), it does not have a precingular archeopyle. Stover and Evitt, 1978, p.188 considered this to be a "problematical species", suggesting that it is an acritarch.

"trabeculosum" (Gocht, 1959). NOW *Chlamydophorella.* See also *"Gardodinium".*

?velatum (Conrad, 1941, p.8-9, pl.1, fig.A) Lentin and Williams, 1976, p.111. Maastrichtian; formerly *Palaeoperidinium.* At the time of the transfer, Lentin and Williams, *op.cit.,* p.111 questionably included this species in *Scriniodinium.* The retention of this species in *Palaeoperidinium* by Stover and Evitt, 1978, p.218 was rejected by Lentin and Williams, 1981, p.249.

?verrucosum Heisecke, 1970, p.232-234, pl.9, fig.2-3; pl.10, fig.3. Danian. Stover and Evitt, 1978, p.188 considered this to be a "provisionally accepted species".

SELENOPEMPHIX Benedek, 1972, p.47; emend. Bujak *in* Bujak *et al.,* 1980, p.82. Harland, 1982a, p.396 designated *Selenopemphix* as a section of the extant subgenus *Protoperidinium* (Berg) Balech, 1974. See also *Omanodinium.*

armata Bujak *in* Bujak *et al.,* 1980, p.83-84, pl.21, fig.1-3; text-fig.23D,24. Late Eocene.

coronata Bujak *in* Bujak *et al.,* 1980, p.84, pl.21, fig.4-5; text-fig.17B,23C. Late Eocene.

elegantula (Williams, 1978, p.797-798, pl.7, fig.7,9) Bujak *in* Bujak *et al.,* 1980, p.84. Middle Eocene; formerly *?Vozzhennikovia.*

SELENOPEMPHIX **(cont'd)**

**nephroides* Benedek, 1972, p.47-48, pl.11, fig.13; pl.16, fig.1-4; emend. Bujak *in* Bujak *et al.*, 1980, p.84; emend. Benedek and Sarjeant, 1981, p.333-334,336. Middle-Late Oligocene. Harland, 1982, p.396 considered this species to represent the encysted stage of *Protoperidinium subinerme* (Paulsen) Loeblich III.

selenoides Benedek, 1972, p.48, pl.11, fig.15; pl.16, fig.5-8; text-fig.22; emend. Bujak *in* Bujak *et al.*, 1980, p.86; emend. Benedek and Sarjeant, 1981, p.336-338, fig.9/6-7 (holotype). Middle-Late Oligocene. According to Lewis *et al.*, 1984, p.31 this species represents the encysted stage of some specimens of *Protoperidinium subinerme* (Paulsen) Loeblich III.

warriensis Biffi and Grignani, 1983, p.143, pl.7, fig.4,7-8,10-14. Oligocene.

SENEGALINIUM Jain and Millepied, 1973, p.22-23; emend. Stover and Evitt, 1978, p.122-123. Lentin and Williams, 1976, p.163 incorrectly concluded that *Senegalinium* is synonymous with *Alterbia*. The type of the genus *Senegalinium*, *S. bicavatum*, appears to have a standard hexa 2a archeopyle and equal antapical horns. Herngreen, 1975, p.60-61 considered *Senegalinium* to be a *jr syn.* of *Deflandrea* Eisenack; emend. Lentin and Williams. This conclusion was rejected by Lentin and Williams, 1977b, p.144 since *Deflandrea* has a broad hexa 2a archeopyle. The views of Harland, 1977a, p.188 regarding the morphology of this genus were also rejected by Lentin and Williams, *op.cit.* Loeblich and Tappan, 1977, p.368 were incorrect in assuming the genera *Alterbia*, *Senegalinium* and *Andalusiella* are synonymous.

"acuminatum" (Cookson and Eisenack, 1958) Loeblich and Tappan, 1977, p.368. NOW *Isabelidinium*. The transfer of this species from *Alterbia* to *Senegalinium* was rejected by Lentin and Williams, 1981, p.9.

aenigmaticum (Boltenhagen, 1977, p.86-88, pl.14, fig.5-10) Lentin and Williams, 1981, p.250. Albian-Turonian; formerly *Deflandrea*.

?asymmetricum (Wilson, 1967a, p.62-63, fig.17-21) Stover and Evitt, 1978, p.123. Erratic, probably Eocene. Originally *Deflandrea;* subsequently *Alterbia*. Stover and Evitt, 1978, p.123 considered this to be a "provisionally accepted species".

**bicavatum* Jain and Millepied, 1973, p.23, pl.1, fig.1-4; text-fig.1B. Campanian-Maastrichtian. This species was erroneously transferred to *Alterbia* by Lentin and Williams, 1976, p.49. Herngreen, 1975, p.61 transferred *Senegalinium bicavatum* to *Deflandrea* Eisenack. Since *Deflandrea* is characterized by a broad hexa 2a archeopyle, this transfer was rejected by Lentin and Williams, 1977b, p.144.

"boloniense" (Riegel, 1974) Stover and Evitt, 1978, p.123. NOW *Phelodinium*.

***SENEGALINIUM* (cont'd)**

cuvillieri (Boltenhagen, 1977, p.99-100, pl.17, fig.3-6) Lentin and Williams, 1980, p.41. Campanian; formerly *Deflandrea.*

?dilwynense (Cookson and Eisenack, 1965c, p.141, pl.18, fig.6-9) Stover and Evitt, 1978, p.123. Paleocene. Originally *Deflandrea;* subsequently *Alterbia.* Stover and Evitt, 1978, p.123 considered this to be a "provisionally accepted species".

"dubium" (Jain and Millepied, 1973). NOW *?Andalusiella.*

ectorugosum (Archangelsky, 1969b, p.192, pl.1, fig.5-7) Stover and Evitt, 1978, p.123. Late Eocene. Originally *Deflandrea;* subsequently *Alterbia.*

"gaditanum" (Riegel, 1974) Harland, 1977a, p.189. NOW *Phelodinium;* formerly *Deflandrea.* See also *Lejeunia* and *Lejeunecysta.*

"granulostriatum" (Jain and Millepied, 1973). NOW *Ceratiopsis.*

"ingramii" (Cookson and Eisenack, 1970a) Loeblich and Tappan, 1977, p.368. NOW *Eurydinium.* The transfer of this species from *Alterbia* to *Senegalinium* was rejected by Lentin and Williams, 1981, p.251.

"kozlowskii" (Gorka, 1963) Harland, 1977a, p.189. See *"Lejeunia kozlowskii".*

laevigatum (Malloy, 1972, p.64, pl.1, fig.1-7) Bujak and Davies, 1983, p.163. Senonian. Originally *Deflandrea;* subsequently *Lejeunia,* then *Andalusiella.* See also *Lejeunecysta.*

macrocystum (Cookson and Eisenack, 1960a, p.3, pl.1, fig.7-8) Stover and Evitt, 1978, p.123. Campanian. Originally *Deflandrea;* subsequently *Alterbia.*

"magnificum" (Stanley, 1965) Harland, 1977a, p.188. NOW *Phelodinium.* Originally *Deflandrea.*

microgranulatum (Stanley, 1965, p.219, pl.19, fig.4-6) Stover and Evitt, 1978, p.123. Paleocene. Originally *Deflandrea;* subsequently *Alterbia.*

microspinosum (Boltenhagen, 1977, p.98-99, pl.17, fig.1-2) Lentin and Williams, 1980, p.41. Campanian-Maastrichtian; formerly *Deflandrea.*

obscurum (Drugg, 1967, p.17, pl.2, fig.8-9; pl.9, fig.5) Stover and Evitt, 1978, p.123. Maastrichtian-Danian. Originally *Deflandrea;* subsequently *Alterbia.*

"pentagonale" (Corradini, 1973) Harland, 1977a, p.189. NOW *Phelodinium.* Originally *Deflandrea.*

***SENEGALINIUM* (cont'd)**

"psilatum" Jain and Millepied, 1973, p.23-24, pl.1, fig.5-6; text-fig.1A. Herngreen, 1975, p.61 considered this species to be a *jr syn.* of *Deflandrea laevigata* Malloy, which is now included in *Andalusiella* Riegel.

sergipense (Herngreen, 1975, p.61, pl.3, fig.13-15) Lentin and Williams, 1980, p.41. Late Senonian; formerly *Deflandrea.*

"tricuspis" (O. Wetzel, 1933a) Harland, 1977a, p.188. NOW *Phelodinium.* Originally *Peridinium;* subsequently *Lejeunia,* then *Astrocysta.*

"trisinum" Jain and Millepied, 1973, p.25, pl.2, fig.16. Lentin and Williams, 1976, p.164 considered this species to be a *jr syn.* of *"Alterbia polymorpha"* (Malloy) Lentin and Williams. This last named species is now included in *Andalusiella.*

SENONIASPHAERA Clarke and Verdier, 1967, p.61.

"?frisia" (Raynaud, 1978). NOW *Sirmiodiniopsis.* Raynaud, *op.cit.* questionably included this species in *Senoniasphaera.*

inornata (Drugg, 1970b, p.811-812, fig.3C-F) Stover and Evitt, 1978, p.80. Danian; formerly *Chiropteridium.*

jurassica (Gitmez and Sarjeant, 1972, p.240-241, pl.14, fig.5,8) Lentin and Williams, 1976, p.85. Kimmeridgian; formerly *Hexagonifera.* The transfer of this species to *Ambonosphaera* by Fensome, 1979, p.51 was rejected by Lentin and Williams, 1981, p.11. Riley, 1979, p.221 suggested that this species may be a *jr syn.* of *Meiourogonyaulax staffinensis.*

lordii (Cookson and Eisenack, 1968, p.112, fig.1,I-K) Lentin and Williams, 1976, p.102. Santonian-Early Campanian; formerly *Ascodinium.* O.C.

microreticulata Brideaux and McIntyre, 1975, p.35, pl.11, fig.7-12; pl.12, fig.1-8. Middle Albian. Lentin and Williams, 1981, p.33 rejected the transfer of this species to *Canningia* by Below, 1981a, p.31.

**protrusa* Clarke and Verdier, 1967, p.61-62, pl.14, fig.7-9; text-fig.24. Santonian.

rotundata Clarke and Verdier, 1967, p.62-63, pl.14, fig.1-3; text-fig.25. Santonian-Campanian.

?sarrisii (Archangelsky, 1969a, p.411, pl.2, fig.5-7) Stover and Evitt, 1978, p.80. Eocene; formerly *?Polystephanephorus.* Stover and Evitt, 1980, p.80 considered this to be a "provisionally accepted species".

"stagonoides" (Benedek, 1972) Helenes, 1983, p.262. NOW *Chiropteridium.* Originally *Ascodinium;* subsequently *Deflandrea.*

SENTUSIDINIUM Sarjeant and Stover, 1978, p.49-50. See also *Batiacasphaera.*

aptiense (Burger, 1980a, p.76, pl.23, fig.1,5; pl.24, fig.1) Burger, 1980b, p.277. Aptian; formerly *Tenua.*

asymmetrum (Fenton *et al.*, 1980, p.160,162, pl.16, fig.1, 3,5) Lentin and Williams, 1981, p.253. Late Bajocian; formerly *Tenua.*

"*?atlanticum*" (Habib, 1972) Sarjeant and Stover, 1978, p.50. NOW *Fromea;* formerly *Tenua.* At the time of the transfer, Sarjeant and Stover, *op. cit.* questionably included this species in *Sentusidinium.*

baculatum (Dodekova, 1975, p.28-29, pl.6, fig.1-3; text-fig.7) Sarjeant and Stover, 1978, p.50. Late Bathonian; formerly *Tenua.*

brevispinosum Courtinat *in* Courtinat and Gaillard, 1980, p.60, pl.9, fig.4,7; text-fig.10e. Late Oxfordian.

capillatum (Davey, 1975, p.155-156, pl.2, fig.4,7) Lentin and Williams, 1981, p.253. Senonian (probably Campanian); formerly *Tenua.*

creberbarbatum Erkmen and Sarjeant, 1980, p.52-54, text-fig.2. Oxfordian-Kimmeridgian.

cuculliforme Davies, 1983, p.29, pl.10, fig.1-4; text-fig.26. Berriasian-Valanginian.

"*densicomatum*" (Maier, 1959) Sarjeant, 1983, p.111. NOW *Impletosphaeridium densicomatum.*

echinatum (Gitmez and Sarjeant, 1972, p.190, pl.1, fig.1,9) Sarjeant and Stover, 1978, p.50. Kimmeridgian; formerly *Tenua.* See also *Batiacasphaera.*

eisenackii (Boltenhagen, 1977, p.56-58, pl.5, fig.5-8) Lentin and Williams, 1981, p.253. Cenomanian-Turonian; formerly *Tenua.*

subsp. *vermiculatum* (Boltenhagen, 1977, p. 57-58, pl.5, fig.7-8) Lentin and Williams, 1981, p.253. Cenomanian-Turonian; formerly *Tenua eisenackii* var. *vermiculata.* This taxon was elevated to the subspecies level at the time of the transfer.

erythrocomum Erkmen and Sarjeant, 1980, p.56,58, pl.2, fig.11; pl.3, fig. 1-6,8-11; pl.4, fig.5; text-fig.5. Late Callovian.

filiatum Davies, 1983, p.29-30, pl.10, fig.5-6,8-9; text-fig.27. Late Oxfordian-Valanginian.

microrobustum (Morgan, 1980) *comb. nov.*
1980 *Tenua microrobusta* Morgan, p.33, pl.29, fig.15-16. Late Neocomian-Late Albian.

***SENTUSIDINIUM* (cont'd)**

myriatrichum Fensome, 1979, p.12-13, pl.2, fig.7; text-fig.5A. Late Oxfordian-Middle Kimmeridgian.

?neophytenseum (Ioannides *et al.*, 1977, p.463, pl.5, fig.5,8-9) Sarjeant and Stover, 1978, p.50. Kimmeridgian; formerly *Tenua.* At the time of the transfer, Sarjeant and Stover, *op.cit.* questionably included this species in *Sentusidinium.*

ornatum Courtinat *in* Courtinat and Gaillard, 1980, p.61-62, pl.9, fig.2-3,5; text-fig.10a. Late Oxfordian.

pelionense Fensome, 1979, p.13-15, pl.1, fig.5-9; text-fig.5B. Bajocian-Bathonian.

pilosum (Ehrenberg, 1854, pl.37, fig.8, no.4) Sarjeant and Stover, 1978, p.50; emend. Erkmen and Sarjeant, 1980, p.51. Oxfordian. Originally *Xanthidium;* subsequently *Ovum hispidum,* then *Hystrichosphaera,* then *Hystrichosphaeridium,* then *Baltisphaeridium,* then *Cleistosphaeridium,* then *Tenua.* See also *Batiacasphaera.*

forma *?nana* (O. Wetzel, 1933b) *comb. nov.*
1933b *Hystrichosphaera* cf. *pilosa* forma *nana* O. Wetzel, p.43, pl.4, fig.23; text-fig.13. Late Cretaceous. Pending re-examination of the holotype, we questionably include this forma in *Sentusidinium pilosum.*

**rioultii* (Sarjeant, 1968, p.231, pl.1, fig.12,22; pl.2, fig.1-2,4) Sarjeant and Stover, 1978, p.50. Late Callovian; formerly *Tenua.* O.C. See also *Batiacasphaera.*

separatum (McIntyre and Brideaux, 1980, p.19-20, pl.6, fig.4-8) Lentin and Williams, 1981, p.254. Valanginian; formerly *Cleistosphaeridium.*

sparsibarbatum Erkmen and Sarjeant, 1980, p.54-56, pl.2, fig.2-8; pl.6, fig.9; text-fig.4. Callovian.

spiculatum Yu Jingxian and Zhang Wangping, 1980, p.107, pl.1, fig.15-16. Campanian-Maastrichtian.

"?varispinosum" (Sarjeant, 1959) Sarjeant and Stover, 1978, p.50. NOW *Cleistosphaeridium.* Originally *Baltisphaeridium;* subsequently *Tenua.* Stover and Evitt, 1978, p.81 considered this to be a "provisionally accepted species" of *Sentusidinium.*

verrucosum (Sarjeant, 1968, p.232, pl.1, fig.17; pl.2, fig.3,6) Sarjeant and Stover, 1978, p.50. Late Callovian; formerly *Tenua.* O.C. See also *Batiacasphaera.*

***SENTUSIDINIUM* (cont'd)**

villersense (Sarjeant, 1968, p.231-232, pl.1, fig.16; pl.2, fig.5-10) Sarjeant and Stover, 1978, p.50. Early Callovian-Early Oxfordian; formerly *Tenua*. O.C. See also *Batiacasphaera*.

"SHUBLIKODINIUM" Wiggins, 1973, p.2-4. *Jr syn.* of *Rhaetogonyaulax* according to Stover and Evitt, 1978, p.218. Individual species' synonymys and transfers are listed below.

"acanthocomum" Wiggins, 1973, p.5, pl.4, fig.5-6. Late Triassic. Stover and Evitt, 1978, p.219 considered this species to be conspecific with *Rhaetogonyaulax arctica* (Wiggins) Stover and Evitt.

*"*arcticum"* (Wiggins, 1973). NOW *Rhaetogonyaulax*.

subsp. *"maculatum"* (Wiggins, 1973) Lentin and Williams, 1973, p.125. NOW *Rhaetogonyaulax arctica* subsp. *maculata* (Wiggins) Stover and Evitt; formerly *Shublikodinium arcticum* var. *maculatum*.

"armatum" Wiggins, 1973, p.6, pl.5, fig.1. Late Triassic. Stover and Evitt, 1978, p.219 considered this species to be conspecific with *Rhaetogonyaulax arctica* (Wiggins) Stover and Evitt.

"dilatatum" (Wiggins, 1973). NOW *Rhaetogonyaulax*.

"echinoverrucatum" Wiggins, 1973, p.6-7, pl.5, fig.5-6. Late Triassic. Stover and Evitt, 1978, p.219 considered this species to be conspecific with *Rhaetogonyaulax dilatata* (Wiggins) Stover and Evitt.

"granulatum" Wiggins, 1973, p.6, pl.5, fig.2. Late Triassic. Stover and Evitt, 1978, p.219 considered this species to be conspecific with *Rhaetogonyaulax dilatata* (Wiggins) Stover and Evitt.

"scaberrimum" Wiggins, 1973, p.7, pl.5, fig.6. Late Triassic. Stover and Evitt, 1978, p.219 considered this species to be conspecific with *Rhaetogonyaulax dilatata* (Wiggins) Stover and Evitt.

"setigerum" Wiggins, 1973, p.5-6, pl.4, fig.10-11. Late Triassic. Stover and Evitt, 1978, p.219 considered this species to be conspecific with *Rhaetogonyaulax arctica* (Wiggins) Stover and Evitt.

"spinulosum" Wiggins, 1973, p.5, pl.4, fig.7-9. Late Triassic. Stover and Evitt, 1978, p.219 considered this species to be conspecific with *Rhaetogonyaulax arctica* (Wiggins) Stover and Evitt.

"verrucosum" Wiggins, 1973, p.5, pl.3, fig.1-11; pl.4, fig.1-3. Late Triassic. Stover and Evitt, 1978, p.219 considered this species to be conspecific with *Rhaetogonyaulax arctica* (Wiggins) Stover and Evitt.

***"SHUBLIKODINIUM verrucosum"* (cont'd)**

subsp. *"exsculptum"* (Wiggins, 1973, p.5, pl.4, fig.4) Lentin and Williams, 1973, p.125. Late Triassic; formerly *Shublikodinium verrucosum* var. *exsculptum*. Stover and Evitt, 1978, p.219 considered this subspecies to be conspecific with *Rhaetogonyaulax arctica* (Wiggins) Stover and Evitt.

SICYOIDIUM He Cheng-quan, 1980, p.8.

**ansatum* He Cheng-quan, 1980, p.8, pl.1, fig.21-22. Oligocene.

"SILICISPHAERA" Davey and Verdier, 1976, p.320-321. *Jr syn.* of *Florentinia* according to Duxbury, 1980, p.119.

"buspina" (Davey and Verdier, 1976). NOW *Florentinia.*

*"*ferox"* (Deflandre, 1937b) Davey and Verdier, 1976, p.322. NOW *Florentinia.* Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium,* then *Hystrichokolpoma.*

"?flosculus" (Deflandre, 1937b) Davey and Verdier, 1976, p.330. NOW *?Florentinia.* Originally *Hystrichosphaeridium;* subsequently *?Litosphaeridium.* At the time of the transfer, Davey and Verdier, *op.cit.* questionably included this species in *Silicisphaera.* O.C.

"ramula" (May, 1980). NOW *Florentinia.*

"tenera" (Davey and Verdier, 1976). NOW *Florentinia.*

"?torulosa" (Davey and Verdier, 1976). NOW *?Florentinia.* Davey and Verdier, *op.cit.*, p.328 questionably included this species in *Silicisphaera.*

"tridactylites" (Valensi, 1955a) Davey and Verdier, 1976, p.330. NOW *Florentinia.* Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium,* then *Achomosphaera.*

SINOCYSTA He Cheng-quan, 1984a, p.769 (translation p.773).

**minuta* He Cheng-quan, 1984a, p.769-770, pl.1, fig.5-7; text-fig.1. Late Cretaceous-Eocene.

SIRMIODINIOPSIS Drugg, 1978, p.73. See also *Arkellidinium* which is a *jr syn.* of this genus.

frisia (Raynaud, 1978, p. 394, pl.1, fig.11) Lentin and Williams, 1981, p.256. Oxfordian-Middle Valanginian; formerly *?Senoniasphaera.*

**orbis* Drugg, 1978, p.73-74, pl.7, fig.11; pl.8, fig.1-4. Callovian. See also *Sirmiodiniopsis triaperta* which is a *jr syn.* of this species.

***SIRMIODINIOPSIS* (cont'd)**

"triaperta" (Beju, 1979, p.4-5, fig.1-2) Lentin and Williams, 1981, p.256. Late Callovian; formerly *Arkellidinium*. Riley and Fenton, 1982, p.199 considered this species to be a *jr syn.* of *Sirmiodiniopsis orbis* Drugg.

SIRMIODINIUM Alberti, 1961, p.22; emend. Warren, 1973, p.104.

**grossii* Alberti, 1961, p.22, pl.7, fig.5-7; pl.12, fig.5; emend. Warren, 1973, p.104-105. Late Hauterivian-Late Barremian. O.C.

oxfordianum (Sarjeant, 1962a, p.485, pl.69, fig.13-14) Courtinat *in* Courtinat and Gaillard, 1980, p.52. Oxfordian. Originally *Scriniodinium;* subsequently *Endoscrinium*.

SMOLENSKIELLA Vozzhennikova, 1967, p.181-182.

**crassitheca* Vozzhennikova, 1967, p.182-183, pl.105, fig.1-4,6; pl.106, fig.1-4. Late Cretaceous.

"SOANIELLA" Vozzhennikova, 1967, p.108. Lentin and Williams, 1976, p.165 designated the type of the genus and single species, *Soaniella granulata*, as a *nomen ambiguum*. They rejected the species in accordance with Art. 69 of the I.C.B.N., thus making *Soaniella* a superfluous genus.

"SPEETONIA" Duxbury, 1977, p.48-49. *Jr hom.* of *Speetonia* Black, 1971. See *Lagenorhytis*.

*"*delicatula"* (Duxbury, 1977). NOW *Lagenorhytis*.

SPINIDINIUM Cookson and Eisenack, 1962b, p.489; emend. Lentin and Williams, 1976, p.62-63.

"aperturum" (Wilson, 1967a). NOW *Vozzhennikovia*.

argentinium nom. nov., nom. subst. pro Dioxya denticulata Pöthe de Baldis and Ramos, 1983, p.438, pl.2, fig.7,11; pl.4, fig.2, *comb. nov., non Spinidinium denticulatum* Pöthe de Baldis and Ramos, 1983, p.441. Early Aptian. This species is transferred to *Spinidinium,* since it better complies with the overall features of this genus.

"boydii" (Morgan, 1975). NOW *Chichaouadinium*.

?clavus Harland, 1973, p.674-675, pl.84, fig.5-6,10; text-fig.9. Late Campanian. Stover and Evitt, 1978, p.125 considered this to be a "provisionally accepted species". O.C. N.I.A.

densispinatum Stanley, 1965, p.226-227, pl.21, fig.1-5. Paleocene.

***SPINIDINIUM* (cont'd)**

denticulatum Pöthe de Baldis and Ramos, 1983, p.441, pl.2, fig.3,8. Early Aptian.

echinoideum (Cookson and Eisenack, 1960a, p.2, pl.1, fig.5-6) Lentin and Williams, 1976, p.64. Santonian-Campanian; formerly *Deflandrea*. The transfer of this species to *Vozzhennikovia* by Stover and Evitt, 1978, p.130 was rejected by Lentin and Williams, 1981, p.257.

subsp. *rhombicum* (Cookson and Eisenack, 1974, p.49-50, pl.20, fig.5-9) Lentin and Williams, 1976, p.64. Albian-Cenomanian; formerly *Deflandrea rhombica*. Lentin and Williams, 1976, p.64 lowered this taxon to the subspecies level because it is distinguished from *Spinidinium echinoideum* only by having a reduced number of spines. The retention of this taxon at the species level by Stover and Evitt, 1978, p.124 was rejected by Lentin and Williams, 1981, p.257.

essoi Cookson and Eisenack, 1967a, p.135, pl.19, fig.1-8. Paleocene.

"gallium" (Davey and Verdier, 1973) Lentin and Williams, 1976, p.64. NOW *Isabelidinium;* formerly *Deflandrea*.

?irmoechinatum (Heisecke, 1970, p.230, pl.1, fig.3; pl.2, fig.2-3) Stover and Evitt, 1978, p.125. Early Paleocene. Originally *Deflandrea;* subsequently *Gonyaulacysta*. Stover and Evitt, 1978, p.125 considered this to be a "provisionally accepted species".

lanterna Cookson and Eisenack, 1970a, p.144-145, pl.12, fig.1-3. Senonian. N.I.A.

macmurdoense (Wilson, 1967a, p.60-62, fig.11-16,22; text-fig.2a) Lentin and Williams, 1976, p.64. Early Tertiary; formerly *Deflandrea*.

mariae Aurisano, 1984, p.5,7, fig.4E-G. Late Santonian.

"microceratum" Stanley, 1965, p.227-228, pl.22, fig.5-6. Stone, 1973, p.53-54 considered this species to be a *jr syn.* of *Spinidinium densispinatum* Stanley.

"montanaense" (Harland, 1977a) Lentin and Williams, 1977b, p.147. NOW *Alterbidinium;* formerly *Deflandrea*.

ornatum (May, 1980, p.77-78, pl.9, fig.3-5) Lentin and Williams, 1981, p.258. Campanian-basal Maastrichtian; formerly *Deflandrea*.

?ovale (Vozzhennikova, 1967, p.99, pl.40, fig.1a-b,2a-b) Lentin and Williams, 1977b, p.147. Paleocene-Eocene; formerly *Canninginopsis*. This species clearly possesses peridiniacean paratabulation and a hexa 2a paraplate (Vozzhennikova, 1967, pl.40, fig.2b). Although the nature of the archeopyle is unknown, the species was questionably placed in *Spinidinium* by Lentin and Williams, 1977b, p.147 because of the peridiniacean paratabulation and denticulate parasutures.

***SPINIDINIUM* (cont'd)**

?pilatum (Stanley, 1965, p.222, pl.21, fig.12-16) Costa and Downie, 1979, p.43. Paleocene; formerly *?Wetzeliella*. At the time of the transfer, Costa and Downie, *op.cit.* questionably included this species in *Spinidinium*.

pulchrum (Benson, 1976, p.194, pl.9, fig.4-9) Lentin and Williams, 1977b, p.147. Early Paleocene; formerly *Deflandrea*.

vallum Heisecke, 1970, p.226-228, pl.1, fig.1-2; pl.2, fig.1. Danian.

"*rhombicum*" (Cookson and Eisenack, 1974) Stover and Evitt, 1978, p.124. NOW *Spinidinium echinoideum* subsp. *rhombicum*.

"*rotundum*" (Wilson, 1967a). NOW *Vozzhennikovia*.

"*rugosum*" (Stanley, 1965) Costa and Downie, 1979, p.45. NOW *?Wilsonidium*. The transfer of this species to *Spinidinium* by Costa and Downie, 1979 was rejected by Lentin and Williams, 1981, p.292.

sagittulum (Drugg, 1970b, p.809-810, fig.1a-c) Lentin and Williams, 1976, p.64. Early Eocene; formerly *Deflandrea*.

**styloniferum* Cookson and Eisenack, 1962b, p.489, pl.1, fig.1-5. Aptian-?Albian.

sverdrupianum (Manum, 1963, p.59-60, pl.2, fig.6-15; text-fig.3) Lentin and Williams, 1973, p.64. Cenomanian; formerly *Deflandrea*. See also *Subtilisphaera*.

uncinatum May, 1980, p.85-86, pl.10, fig.5-7; pl.13, fig.9-10. Campanian-Maastrichtian.

"*?vestitum*" (Brideaux, 1971). NOW *Chichaouadinium*. The transfer of this species to *Deflandrea* by Sverdlove and Habib, 1974, p.59-60 was rejected by Lentin and Williams, 1977b, p.148. Stover and Evitt, 1978, p.125 considered this to be a "provisionally accepted species" of *Spinidinium*.

SPINIFERITES Mantell, 1850, p.191; emend. Sarjeant, 1970, p.75. See *Hystrichosphaera* and *Hystrichokibotium* which are *jr synonyms* of this genus. See also *Achomosphaera*.

alatus Duxbury, 1977, p.49, pl.5, fig.4. Berriasian-Valanginian.

aligerus Ch. Singh, 1983, p.143-144, pl.50, fig.1-6; pl.51, fig.1. Early Cenomanian.

ancoriferus Cookson and Eisenack, 1974, p.58, pl.21, fig.4-5. Middle-Late Cretaceous.

subsp. *ghiran* Below, 1982c, p.32, pl.7, fig.6,8-9. Gargasian.

SPINIFERITES (cont'd)

antistatus Islam, 1983a, p.244, pl.4, fig.4-6; text-fig.4. Early Eocene.

aracajuensi (Regali *et al.*, 1974, p.291, pl.24, fig.6) Lentin and Williams, 1981, p.259. Paleocene-Early Eocene; formerly *Hystrichosphaeridium*. O.C.

asperulus Matsuoka, 1983b, p.131-132, pl.12, fig.2-4; text-fig.17. Pliocene or younger.

?*assamicus* (Kar *et al.*, 1972, p.147, pl.1, fig.6-7) Lentin and Williams, 1973, p.126. Tertiary; formerly *Hystrichosphaera*. Stover and Evitt, 1978, p.190 considered this to be a "provisionally accepted species". Jain, 1982, p.52 considered that the name must be restricted to the holotype.

belerius Reid, 1974, p.596-598, pl.2, fig.12-13. Recent.

bentorii (Rossignol, 1964, p.84-85, pl.1, fig.3,3bis,7-8; pl.3, fig.2-3; text-fig.A-F) Wall and Dale, 1970, p.47-48. Pleistocene-Holocene; formerly *Hystrichosphaera*. *Spiniferites bentorii* (as *Hystrichosphaera)* was figured but not described in Rossignol, 1961, pl.1, fig.7-8, and described but not illustrated or adequate reference made to the above illustrations in Rossignol, 1962, p.132. O.C. See also *Leptodinium churchillii*.

subsp. *truncatus* (Rossignol, 1964, p.85, pl.1, fig.5-6; pl.3, fig.1) Lentin and Williams, 1973, p.126. Quaternary; formerly *Hystrichosphaera bentori* var. *truncata*. O.C.

"*buccinus*" (Davey and Williams, 1966a, p.42-43, pl.4, fig.1; text-fig.10-11) Sarjeant, 1970, p.75. Formerly *Hystrichosphaera*. Lentin and Williams, 1973, p.126 considered this species to be a *jr syn.* of *Spiniferites pseudofurcatus* (Klumpp) Sarjeant.

bulloideus (Deflandre and Cookson, 1955, p.264, pl.5, fig.3-4) Sarjeant, 1970, p.75. Eocene-Miocene; formerly *Hystrichosphaera*. Harland, 1977b, p.101-102 considered this species to be a *jr syn.* of *Spiniferites ramosus*, but stated that *S. bulloideus sensu* Wall, 1965, was a distinct and different morphotype from *S. bulloideus*.

"*cambrus*" (Sah *et al.*, 1970, p.144, pl.1, fig.3) Stover and Evitt, 1978, p.190. Late Cretaceous; formerly *Achomosphaera*. Jain, 1982, p.51 considered this species to be a *jr syn.* of *Spiniferites multibrevis* (Davey and Williams) Below.

"*ceratioides*" (Deflandre, 1937b) Sarjeant, 1970, p.76. NOW *Xenascus ceratioides;* formerly *Hystrichosphaera*. The transfer of this species to *Spiniferites* by Sarjeant, 1970, p.76 was rejected by Lentin and Williams, 1973, p.127.

SPINIFERITES (cont'd)

"?cingulatus" (O. Wetzel, 1933b) Sarjeant, 1970, p.76. NOW *Pterodinium*. Originally *Cymatiosphaera;* subsequently *Hystrichosphaera*. Stover and Evitt, 1978, p.190 considered this to be a "provisionally accepted species" of *Spiniferites*.

subsp. *"cingulatus"* (O. Wetzel, 1933b) Lentin and Williams, 1973, p.127. NOW *Pterodinium cingulatum* subsp. *cingulatum*. Originally *Cymatiosphaera cingulata* var. *cingulata;* subsequently *Hystrichosphaera cingulata* var. *cingulata*. Transfer of the variety to *Spiniferites* was effected by Davey and Verdier, 1971, p.32.

subsp. *"granulatus"* (Clarke and Verdier, 1967) Lentin and Williams, 1973, p.127. NOW *Pterodinium cingulatum* subsp. *granulatum;* formerly *Hystrichosphaera cingulata* var. *granulata*.

subsp. *"intermedius"* (Cookson and Eisenack, 1974) Lentin and Williams, 1977b, p.149. NOW *Pterodinium cingulatum* subsp. *intermedium;* formerly *Spiniferites cingulatus* var. *intermedius*.

subsp. *"ovalis"* (Cookson and Eisenack, 1974) Lentin and Williams, 1977b, p.149. NOW *Pterodinium cingulatum* subsp. *ovale;* formerly *Spiniferites cingulatus* var. *ovalis*.

subsp. *"perforatus"* (Clarke and Verdier, 1967, p.46-47, pl.9, fig.2-4; text-fig.19) Lentin and Williams, 1973, p.127. Clarke *et al.*, 1968, p.181 considered this taxon (as *Hystrichosphaera cingulata* var. *perforata)* to be a *jr syn.* of *Hystrichosphaera cingulata* var. *reticulata* Davey and Williams, which is now *Pterodinium cingulatum* subsp. *reticulatum*.

subsp. *"polygonalis"* (Clarke and Verdier, 1967, p.47, pl.8, fig.7-8; text-fig.20) Lentin and Williams, 1973, p.127. Clarke *et al.*, 1968, p.181 considered this taxon (as *Hystrichosphaera cingulata* var. *polygonalis)* to be a *jr syn.* of *Hystrichosphaera crassimurata* Davey and Williams, which is now included in *Spiniferites*.

subsp. *"reticulatus"* (Davey and Williams, 1966a) Lentin and Williams, 1973, p.127. NOW *Pterodinium cingulatum* subsp. *reticulatum;* formerly *Hystrichosphaera cingulata* var. *reticulata*. Transfer of this taxon to *Spiniferites* was effected by Davey and Verdier, 1971, p.33.

compactus Cookson and Eisenack, 1974, p.59, pl.21, fig.11. ?Aptian-Albian.

confossus Davey, 1979b, p.559, pl.8, fig.1-4. Aptian.

cooksoniae Lentin and Williams, 1977b, p.149, *nom. subst. pro S. granulatus* (Cookson and Eisenack, 1974, p.59, pl.27, fig.7) *non S. granulatus* Davey, 1969b. ?Aptian-Albian. O.C.

SPINIFERITES **(cont'd)**

?cornigerus (O. Wetzel, 1933b, p.39, pl.5, fig.6) Sarjeant, 1970, p.76. Late Cretaceous; formerly *Hystrichosphaera*. Stover and Evitt, 1978, p.191 considered this to be a "provisionally accepted species".

cornutus (Gerlach, 1961, p.180, pl.27, fig.10-12) Sarjeant, 1970, p.76. Middle Oligocene-Middle Miocene; formerly *Hystrichosphaera*.

subsp. *"aspinatus"* (Cookson and Eisenack, 1974) Lentin and Williams, 1977b, p.149. NOW *Impagidinium aspinatum;* formerly *Spiniferites cornutus* var. *aspinatus*.

subsp. *cornutus* (Gerlach, 1961, p.180, pl.27, fig.10-12) Sarjeant, 1970, p.76. Middle Oligocene-Middle Miocene; formerly *Hystrichosphaera*. Cookson and Eisenack, 1974, p.62 are incorrect in their citation *Spiniferites cornutus* (Gerlach, 1961) subsp. *cornutus subsp. nov.* When Sarjeant 1970, p.76 transferred the species *"Hystrichosphaera cornutus"* to *Spiniferites,* he also in effect transferred the subspecies. See also *Spiniferites cornutus* subsp. *opisthophorus* which is a *jr syn.* of this subspecies.

subsp. *"crassifurcatus"* (Cookson and Eisenack, 1974, p.63, pl.22, fig.9) Lentin and Williams, 1977b, p.150. Albian-Cenomanian; formerly *Spiniferites cornutus* var. *crassifurcatus*. Below, 1982c, p.33 considered this subspecies to be a *jr syn.* of *Spiniferites cornutus* subsp. *laevimurus*.

subsp. *laevimurus* (Davey and Williams, 1966a, p.44-45, pl.4, fig.5) Lentin and Williams, 1973, p.127. Early Eocene; formerly *Hystrichosphaera cornuta* var. *laevimura*. Cookson and Eisenack, 1974, p.62 considered this subspecies to be a *jr syn.* of *Spiniferites cornutus* subsp. *cornutus* (Gerlach) Sarjeant. According to Below, 1982c, p.33, *Spiniferites cornutus* subsp. *laevimurus* differs from *Spiniferites cornutus* subsp. *cornutus* in having smooth membranes. See also *Spiniferites cornutus* subsp. *crassifurcatus* and *S. cornutus* subsp. *normalis* which are *jr synonyms* of this subspecies.

subsp. *"normalis"* (Cookson and Eisenack, 1974, p.62, pl.23, fig.5) Lentin and Williams, 1977b, p.150. Paleocene; formerly *Spiniferites cornutus* var. *normalis*. Below, 1982c, p.33 considered this subspecies to be a *jr syn.* of *Spiniferites cornutus* subsp. *laevimurus*.

subsp. *"opisthophorus"* (Cookson and Eisenack, 1974, p.62, pl.23, fig.1-4) Lentin and Williams, 1977b, p.150. Paleocene; formerly *Spiniferites cornutus* var. *opisthophorus*. Below, 1982c, p.33 considered this subspecies to be a *jr syn.* of *Spiniferites cornutus* subsp. *cornutus*.

***SPINIFERITES cornutus* (cont'd)**

subsp. *"sinefurcatus"* (Cookson and Eisenack, 1974, p.63, pl.22, fig.8) Lentin and Williams, 1977b, p.150. Albian-Cenomanian; formerly *Spiniferites cornutus* var. *sinefurcatus*. Below, 1982c, p.33 considered this subspecies to be a *jr syn.* of *Spiniferites ramosus* subsp. *brevifurcatus*.

"crassimuratus" (Davey and Williams, 1966a, p.39, pl.1, fig.11) Sarjeant, 1970, p.76. Cenomanian; formerly *Hystrichosphaera*. Kjellström, 1973, p.44 considered this species to be a *jr syn.* of *Spiniferites pterotus* (Cookson and Eisenack) Sarjeant.

"crassipellis" (Deflandre and Cookson, 1955) Sarjeant, 1970, p.76. NOW *Achomosphaera;* formerly *Hystrichosphaera*.

cristatus (Conrad, 1941, p.4-5, pl.1, fig.D; text-fig.2D) Lentin and Williams, 1973, p.128. Maastrichtian; formerly *Hystrichosphaera*. Stover and Evitt, 1978, p.191 considered this to be a "problematical species".

cruciformis Wall and Dale *in* Wall *et al.*, 1973, p.21-22, pl.1, fig. 1-6; pl.2, fig.1-4. Early Holocene.

delicatus Reid, 1974, p.601-602, pl.2, fig.20-22. Recent.

?dentatus (Gocht, 1959, p.75-76, pl.4, fig.11; pl.7, fig.19) Lentin and Williams, 1973, p.128; emend. Duxbury, 1977, p.49-50. At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Spiniferites*. Late Hauterivian; formerly *?Hystrichosphaera*.

ellipsoideus Matsuoka, 1983b, p.132-133, pl.13, fig.6-7. Middle-Late Miocene.

elongatus Reid, 1974, p.602-603, pl.3, fig.23-24. Recent.

firmus Matsuoka, 1983b, p.134, pl.14, fig.4-5. Early Pleistocene.

frigidus Harland and Reid *in* Harland *et al.*, 1980, p.213-216, fig.2A-J; text-fig.3. Recent. Because the species was recovered from unconsolidated sediments in the Beaufort Sea does not necessarily imply that it is Recent. The sediments at the type locality are unconsolidated down to 8000' below the surface and reworking is extensive.

"furcatus" (Ehrenberg, 1838, pl.1, fig.12,14). Davey and Williams, 1966a, p.29-33 considered *"Hystrichosphaera furcata"* to be a synonym of *Hystrichosphaera ramosa*, which is now the type of the genus *Spiniferites*. Since the original specimens of *"Spiniferites furcatus"* have been lost, whereas the specimens of *Spiniferites ramosus* are preserved, it appears that *S. ramosus* should have priority.

***SPINIFERITES* (cont'd)**

granulatus (Davey, 1969b, p.4-5, pl.1, fig.4-7) Lentin and Williams, 1973, p.128. Maastrichtian-?Danian; formerly *Hystrichosphaera*.

"granulatus" (Cookson and Eisenack, 1974). NOW *Spiniferites cooksoniae* Lentin and Williams, 1977b, *non S. granulatus* Davey, 1969b.

"heterostylis" (Heisecke, 1970) Lentin and Williams, 1973, p.128. NOW *Achomosphaera;* formerly *Hystrichosphaera*.

hexatypicus Matsuoka, 1983b, p.133-134, pl.13, fig.1-3; text-fig.18. Middle-Late Miocene.

"?hirundo" (Eisenack, 1958) Sarjeant, 1981, p.123. The transfer of this species to *?Spiniferites* by Sarjeant, *op.cit.* is herein rejected and the species is retained in *?Cordosphaeridium*.

hyperacanthus (Deflandre and Cookson, 1955, p.264-265, pl.6, fig.7) Cookson and Eisenack, 1974, p.59. Miocene. Originally *Hystrichosphaera;* subsequently *Achomosphaera*. Reid, 1974, p.603 also transferred this species to *Spiniferites*.

inaequalis Wall and Dale *in* Wall *et al.,* 1973, p.22, pl.1, fig.7-8. Holocene.

incertus (Klumpp, 1953, p.389-390, pl.17, fig.1-2; emend. Morgenroth, 1966a, p.15) Sarjeant, 1981, p.109-110, pl.1, fig.2; pl.5, fig.1. Late Eocene. Originally *Areoligera*. At the time of the transfer, Sarjeant, 1981, p.109-110 emended the diagnosis. This species was considered to be a *jr syn.* of *Spiniferites pseudofurcatus* by Gocht, 1969, p.32.

katatonos Corradini, 1973, p.169, pl.25, fig.3a-c,6a-b; pl.37, fig.1-2. Late Cretaceous-Paleocene.

lazus Reid, 1974, p.604-605, pl.3, fig.25-27. Recent.

lenzii Below, 1982c, p.34, pl.7, fig.7; pl.8, fig.3,6; text-fig.7. Albian.

"leptodermus" (Maier, 1959) Sarjeant, 1970, p.76. See *"Hystrichosphaeridium leptodermum"*.

?magnoserratus (Cookson and Eisenack, 1962b, p.490, pl.3, fig.7-8) Stover and Evitt, 1978, p.191. Aptian-?Albian; formerly *Pterodinium*. Stover and Evitt, 1978, p.191 considered this to be a "provisionally accepted species". See also *Gonyaulacysta*.

"makropterus" (Cookson and Eisenack, 1982). NOW *?Pterodinium*.

***SPINIFERITES* (cont'd)**

?maranhensis (Regali *et al.*, 1974, p.291, pl.23, fig.3) Lentin and Williams, 1981, p.263. Albian-Cenomanian; formerly *Hystrichosphaeridium*. At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Spiniferites*.

membranaceus (Rossignol, 1964, p.86, pl.1, fig.4,9-10; pl.3, fig.7,12) Sarjeant, 1970, p.76. Pleistocene-Recent; formerly *Hystrichosphaera furcata* var. *membranacea*. This taxon was elevated to specific rank as *Hystrichosphaera membranacea* by Wall, 1967, p.102.

membranosus (Archangelsky, 1969b, p.197-199, pl.3, fig.1-4) Lentin and Williams, 1973, p.128. Late Eocene; formerly *Hystrichosphaera*.

microceras Cookson and Eisenack, 1974, p.60-61, pl.22, fig.10-12; pl.24, fig. 1-2. Paleocene.

subsp. *laticornutus* (Cookson and Eisenack, 1974, p.61, pl.22, fig.11) Lentin and Williams, 1977b, p.151. Paleocene; formerly *Spiniferites microceras* var. *laticornutus*.

subsp. *microceras* (Cookson and Eisenack, 1974, p.60-61, pl.22, fig.10; pl.24, fig.1-2) Lentin and Williams, 1977b, p.151. Paleocene; formerly *Spiniferites microceras* var. *microceras*.

subsp. *opisthophorus* (Cookson and Eisenack, 1974, p.61, pl.22, fig.12) Lentin and Williams, 1977b, p.152. Paleocene; formerly *Spiniferites microceras* var. *opisthophorus*.

mirabilis (Rossignol, 1963, pl.2, fig.16-21, described but not figured in Rossignol, 1962, p.132) Sarjeant, 1970, p.76. Pleistocene; formerly *Hystrichosphaera*.

monilis (Davey and Williams, 1966a, p.45, pl.5, fig.2) Sarjeant, 1970, p.76; emend. Eaton, 1976, p.282. Early Eocene; formerly *Hystrichosphaera*.

multibrevis (Davey and Williams, 1966a, p.35-36, pl.1, fig.4; pl.4, fig.6; text-fig.9) Below, 1982c, p.35. Hauterivian. Originally *Hystrichosphaera ramosus* var. *multibrevis;* subsequently *Spiniferites ramosus* subsp. *multibrevis*. See also *Spiniferites cambrus* which is a *jr syn.* of this species.

subsp. *chebca* Below, 1982c, p.35, pl.8, fig.7-9. Hauterivian-Aptian.

subsp. *seghiris* Below, 1982c, p.35-36, pl.8, fig.4-5. Late Hauterivian.

"nanus" Matsuoka, 1976, p.111, pl.28, fig.1-3. Pleistocene. According to Matsuoka, 1983a, p.23, this species is a *jr syn.* of *Spiniferites bulloideus* (Deflandre and Cookson) Sarjeant.

***SPINIFERITES* (cont'd)**

"neptunii" (Eisenack, 1958) Duxbury, 1983, p.55. Since we are retaining the genus *Achomosphaera* in this index, we reject the emendation and transfer of this species to *Spiniferites*.

nodosus (Wall, 1967, p.101, pl.14, fig.7-9; text-fig.2) Sarjeant, 1970, p.76. Quaternary; formerly *Hystrichosphaera*. Reid, 1974, p.598 considered this species to be a *jr syn.* of *Spiniferites bentorii* (Rossignol) Sarjeant. This view was rejected by Lentin and Williams, 1981, p.264. See also *Leptodinium churchillii*.

ovatus Matsuoka, 1983b, p.134-135, pl.3, fig.1-4; text-fig.19. Late Miocene.

"ovatus" Bujak, 1984, p.192, pl.3, fig.15-18 *non Spiniferites ovatus* Matsuoka, 1983b. Late Miocene-Early Pliocene. According to Bujak (pers. comm.), Bujak, 1984, p.192 described the same species giving it the same name as that described by Matsuoka, 1983b, p.134-135; thus *Spiniferites ovatus* Bujak, 1984 is a *jr syn.* and a *jr hom.* of *Spiniferites ovatus* Matsuoka, 1983b.

pachyderma (Rossignol, 1964, p.86, pl.1, fig.1-2; pl.3, fig.6) Reid, 1974, p.607. Pleistocene-Holocene. Originally *Hystrichosphaera furcata* var. *pachyderma;* subsequently *Spiniferites ramosus* subsp. *pachyderma*. N.I.A.

"palmatus" (White, 1842) Mantell, 1854, p.251. NOW *Hystrichosphaeridium;* originally *Xanthidium*.

paradoxus (Cookson and Eisenack, 1968, p.114; text-fig.2G,3) Sarjeant, 1970, p.76. Senonian; formerly *Hystrichosphaera*.

?pedatus (O. Wetzel, 1933b, p.55-56, pl.4, fig.35) Lentin and Williams, 1973, p.129. Late Cretaceous; formerly *?Hystrichosphaera*. At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Spiniferites*.

perforatus (Davey and Williams, 1966a, p.41, pl.5, fig.7) Sarjeant, 1970, p.76. Early Eocene; formerly *Hystrichosphaera*.

polyplasius (Maier, 1959, p.322-323, pl.33, fig.7-8) Sarjeant, 1983, p.96. Miocene; formerly *Hystrichosphaeridium*. At the time of the transfer, the species was emended by Sarjeant, 1983, p.96-97.

porosus (Manum and Cookson, 1964, p.11-12, pl.2, fig.1-5; text-fig.2) Harland, 1973, p.690. Late Cretaceous; formerly *Hystrichosphaera*.

***SPINIFERITES* (cont'd)**

pseudofurcatus (Klumpp, 1953, p.388, pl.16, fig.12-14) Sarjeant, 1970, p.76; emend. Sarjeant, 1981, p.108-109. Late Eocene. Originally *Hystrichokibotium;* subsequently *Hystrichosphaera.* For the present taxonomic position of *Hystrichosphaera pseudofurcata* Varma and Dangwal, see *Spiniferites varmae* Lentin and Williams, 1973, p.129. See *Achomosphaera alcicornu* and *Spiniferites incertus.* See also *Spiniferites buccinus* and *S. tertiarius* which are *jr synonyms* of this species.

subsp. *obliquus* (Wall, 1967, p.103, pl.14, fig.16; text-fig.2) Lentin and Williams, 1973, p.129. Late Pleistocene-Recent; formerly *Hystrichosphaera tertiaria* var. *obliqua.*

"?pterotus" (Cookson and Eisenack, 1958, p.50, pl.11, fig.7) Sarjeant, 1970, p.76. Albian-Maastrichtian; formerly *Cymatiosphaera. Jr syn.* of *Pterodinium cingulatum* (O. Wetzel) Below according to Below, 1981a, p.114. Stover and Evitt, 1978, p.191 considered this to be a "provisionally accepted species" of *Spiniferites.*

**ramosus* (Ehrenberg, 1838, pl.1, fig.1-2,5) Loeblich and Loeblich, 1966, p.56-57. Late Cretaceous. Originally *Xanthidium;* subsequently *Ovum hispidum,* then *Hystrichosphaera.* Davey and Williams, 1966a, p.29-33 considered *"Hystrichosphaera furcata"* to be a synonym of *Spiniferites ramosus* (as *"Hystrichosphaera ramosa").* Accordingly, all subspecies of *"Hystrichosphaera furcata"* are included below as subspecies of *Spiniferites ramosus.* See also *Spiniferites bulloideus.* The following species are considered to be *synonyms* of *Spiniferites ramosus: Areoligera birama, A. dermatica, Galea koryka, Hystrichosphaeridium echinoides.*

subsp. *?angustus* (W. Wetzel, 1952, p.394, pl.A, fig.2; text-fig.2) Lentin and Williams, 1973, p.129; emend. Sarjeant, 1984c, p.125-126. Danian; formerly *Hystrichosphaera furcata* subsp. *angusta.* At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this subspecies in *Spiniferites ramosus.* Sarjeant's suggestion, *op.cit.* that this subspecies should be lowered to the varietal level is herein rejected.

subsp. *?aulosphaeropsis* (O. Wetzel, 1933b, p.35, pl.5, fig.5) Lentin and Williams, 1973, p.129. Late Cretaceous; formerly *Hystrichosphaera furcata* forma *aulosphaeropsis.* At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this subspecies in *Spiniferites ramosus.*

subsp. *brevifurcatus* (Cookson and Eisenack, 1974, p.57, pl.21, fig.6,9) Lentin and Williams, 1977b, p.153. Turonian-Senonian; formerly *Spiniferites ramosus* var. *brevifurcatus.* See also *Spiniferites cornutus* subsp. *sinefurcatus* which is a *jr syn.* of this subspecies.

subsp. *cavispinosus* Hansen, 1977, p.13, fig.21D-E. Maastrichtian.

SPINIFERITES *ramosus* (cont'd)

subsp. *endoperforatus* (Corradini, 1973, p.168, pl.26, fig.9-10) Lentin and Williams, 1975, p.2155. Senonian; formerly *Spiniferites ramosus* var. *endoperforatus*.

subsp. *gracilis* (Davey and Williams, 1966a, p.34-35, pl.1, fig.5; pl.5, fig.6) Lentin and Williams, 1973, p.130. Cenomanian-Eocene; formerly *Hystrichosphaera ramosa* var. *gracilis*. Transfer of the variety to *Spiniferites* was effected by Corradini, 1973, p.165. See *Hystrichosphaeridium plicatum*.

subsp. *granomembranaceus* (Davey and Williams, 1966a, p.37-38, pl.4, fig.4) Lentin and Williams, 1973, p. 130. Early Eocene; formerly *Hystrichosphaera ramosa* var. *granomembranacea*. Transfer of the variety to *Spiniferites* was effected by Corradini, 1973, p.166.

subsp. *granosus* (Davey and Williams, 1966a, p.35, pl.4, fig.9) Lentin and Williams, 1973, p.130. Early Eocene; formerly *Hystrichosphaera ramosa* var. *granosa*. Transfer of the variety to *Spiniferites* was effected by Corradini, 1973, p.167.

subsp. *meandriformis* (Corradini, 1973, p.168-169, pl.26, fig.11-12) Lentin and Williams, 1975, p.2155. Senonian; formerly *Spiniferites ramosus* var. *meandriformis*.

subsp. *multibrachiatus* (deWit, 1943, p.376; text-fig.3f) Lentin and Williams, 1973, p.130. Late Cretaceous; formerly *Hystrichosphaera furcata* forma *multibrachiata*.

subsp. *"multibrevis"* (Davey and Williams, 1966a) Lentin and Williams, 1973, p.130. NOW *Spiniferites multibrevis*; formerly *Hystrichosphaera ramosa* var. *multibrevis*. Transfer of the variety to *Spiniferites* was effected by Davey and Verdier, 1971, p.33.

subsp. *multiplicatus* (Rossignol, 1964, p.86, pl.1, fig.14; pl.3, fig.16) Lentin and Williams, 1973, p.130. Pleistocene-Holocene; formerly *Hystrichosphaera furcata* var. *multiplicata*.

subsp. *"pachydermus"* (Rossignol, 1964) Lentin and Williams, 1973, p.130. NOW *Spiniferites pachydermus*; formerly *Hystrichosphaera furcata* var. *pachyderma*.

subsp. *primaevus* Duxbury, 1977, p.50-51, pl.4, fig.2-3. Valanginian.

subsp. *ramosus* (Ehrenberg, 1838, pl.1, fig.1-2,5) Loeblich and Loeblich, 1966, p.56-57. Late Cretaceous. Originally *Xanthidium*; subsequently *Ovum hispidum*, then *Hystrichosphaera*. See also *Homotryblium distinctum* which is a *jr syn*. of this subspecies.

SPINIFERITES ***ramosus*** **(cont'd)**

subsp. *reticulatus* (Davey and Williams, 1966a, p.38, pl.1, fig.2-3) Lentin and Williams, 1973, p.130. Cenomanian; formerly *Hystrichosphaera ramosa* var. *reticulata*. Transfer of the variety to *Spiniferites* was effected by Davey and Verdier, 1971, p.34.

subsp. *spinosus* Jain, 1978, p.149, pl.1, fig.3. Maastrichtian.

"ramuliferus" (Deflandre, 1937b) Reid, 1974, p.608. The transfer of this species from *Achomosphaera* to *Spiniferites* by Reid, 1974, p.608-609 was rejected by Lentin and Williams, 1977b, p.153.

reginaldii (Mantell, 1844, p.240; text-fig.53, no.5) Sarjeant, 1970, p.76. Late Cretaceous. Originally *Xanthidium;* subsequently *Hystrichosphaera,* then *Baltisphaeridium*. Stover and Evitt, 1978, p.191 considered this to be a "problematical species".

rubinus (Rossignol, 1964, p.87, pl.1, fig.12-13; pl.3, fig.22-23) Sarjeant, 1970, p.76. Quaternary; formerly *Hystrichosphaera*.

scabratus (Wall, 1967, p.102, pl.14, fig.10-13; text-fig.2) Sarjeant, 1970, p.76. Pleistocene-Recent; formerly *Hystrichosphaera*.

scabrosus (Clarke and Verdier, 1967, p.49-50, pl.9, fig.7-10; text-fig.21) Lentin and Williams, 1975, p.2155. Cenomanian-Santonian; formerly *Hystrichosphaera*. The transfer of this species from *Hystrichosphaera* to *Spiniferites* is not attributable to Harker and Sarjeant, 1975, p.225.

"septatus" (Cookson and Eisenack, 1967b) McLean, 1971, p.730. NOW *Hafniasphaera*. Originally *Baltisphaeridium*. See also *Achomosphaera*.

septentrionalis Harland, 1977b, p.103-104, pl.1, fig.12-18; text-fig.4. Late Quaternary.

serratus Matsuoka, 1983b, p.135-136, pl.14, fig.1-3; text-fig.20. Pliocene or younger.

setosus (Philippot, 1949, p.56; text-fig.1) Sarjeant, 1970, p.76-77. Senonian; formerly *Hystrichosphaera*. Stover and Evitt, 1978, p.191 considered this to be a "problematical species".

?speciosus (Deflandre, 1937b, p.65, pl.11, fig.2) Sarjeant, 1970, p.77. Late Cretaceous; formerly *Hystrichosphaera*. Stover and Evitt, 1978, p.191 considered this to be a "provisionally accepted species".

speetonensis Duxbury, 1980, p.131-132, pl.11, fig.1-2,4. Barremian.

splendidus Harland, 1979b, p.537, pl.3, fig.1-2. Late Miocene-Early Pliocene.

strictus Matsuoka, 1983b, p.136-137, pl.12, fig.5-6. Pliocene or younger.

***SPINIFERITES* (cont'd)**

supparus (Drugg, 1967, p.24, pl.4, fig.5-6) Sarjeant, 1970, p.77. Maastrichtian-Danian; formerly *Hystrichosphaera*.

"tertiarius" (Eisenack and Gocht, 1960, p.515; text-fig.4) Lentin and Williams, 1973, p.131. *Jr syn.* of *Spiniferites pseudofurcatus* according to Gocht, 1969, p.32 and Sarjeant, 1970, p.76; formerly *"Hystrichosphaera tertiaria"*.

?trabeculiferum (Deflandre and Cookson, 1955, p.269, pl.8, fig.6) Lentin and Williams, 1973, p.131. Middle Miocene; formerly *Hystrichokibotium*. Stover and Evitt, 1978, p.191 considered this to be a "provisionally accepted species".

?tripodes (Morzadec-Kerfourn, 1966, p.140-141, pl.3, fig.3-4) Lentin and Williams, 1973, p.131. Holocene; formerly *Baltisphaeridium*. At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Spiniferites*.

tripus Ch. Singh, 1983, p.144-145, pl.51, fig.2-3. Early Cenomanian.

varmae Lentin and Williams, 1973, p.131, *nom. subst. pro Hystrichosphaera pseudofurcata* Varma and Dangwal, 1964 (p.66, pl.2, fig.7-8); *non Spiniferites pseudofurcatus* (Klumpp) Sarjeant. Eocene-Oligocene. Stover and Evitt, 1978, p.191 considered this to be a "problematical species".

?velatus (Clarke and Verdier, 1967, p.51-52, pl.10, fig.1-2; text-fig.22) Stover and Evitt, 1978, p.191. Santonian; formerly *Nematosphaeropsis*. Stover and Evitt, 1978, p.191 considered this to be a "provisionally accepted species".

wetzelii (Deflandre, 1937b, p.65, pl.11, fig.6,8) Sarjeant, 1970, p.77. Senonian; formerly *Hystrichosphaera*.

SPINIFEROPSIS He Cheng-quan, 1984a, p.770 (translation p.773-774).

**granulata* He Cheng-quan, 1984a, p.170, pl.1, fig.1. Late Paleocene-Middle Eocene.

SPONGODINIUM Deflandre, 1936b, p.169-170; emend. Stover and Evitt, 1978, p.191-192.

canadense Ch. Singh, 1983, p.141, pl.49, fig.1-3. Early Cenomanian.

**delitiense* (Ehrenberg, 1838, p.110, pl.1, fig.1,6) Deflandre, 1936b, p.170-171. Late Cretaceous; formerly *Peridinium*.

"?extremum" (Cookson and Eisenack, 1974) Lentin and Williams, 1976, p.40. NOW *?Isabelidinium;* formerly *Deflandrea*. At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Spongodinium*.

SPONGODINIUM **(cont'd)**

?solidum Alberti, 1961, p.31-32, pl.3, fig.17-18. Late Barremian-Aptian. Alberti, *op.cit.* questionably included this species in *Spongodinium*.

STELLADINIUM Bradford, 1975, p.3065-3066. Harland, 1982a, p.395 designated *Stelladinium* as a section of the extant subgenus *Archaeperidinium* (Jörgensen) Balech, 1974.

**reidii* Bradford, 1975, p.3065-3066, fig.2-4. Recent. Bradford and Wall, 1984, p.47 considered this species to represent the encysted stage of *Protoperidinium compressum* (Abé) Balech, 1974.

stellatum (Wall and Dale, 1968, p.275, pl.2, fig.15) Reid, 1977, p.443. Recent; formerly *Peridinium*. Matsuoka, 1984b, p.2 considered this species to represent the encysted stage of *Protoperidinium compressum* (Abé) Balech.

STENOPYXINIUM Deflandre, 1968, p.424.

**grassei* Deflandre, 1968, p.425-426, fig.1-6. Senonian.

STEPHANELYTRON Sarjeant, 1961a, p.109; emend. Stover *et al.*, 1977, p.331.

caytonense Sarjeant, 1961a, p.110, pl.15, fig.16; text-fig.11; emend. Stover *et al.*, 1977, p.332. Early Oxfordian.

cretaceum Duxbury, 1983, p.56, pl.7, fig.5-6. Early-Late Aptian.

**redcliffense* Sarjeant, 1961a, p.109-110, pl.15, fig.11; text-fig.10; emend. Stover *et al.*, 1977, p.331-332. Early Oxfordian.

scarburghense Sarjeant, 1961a, p.111, pl.15, fig.12-13; emend. Stover *et al.*, 1977, p.333. Early Oxfordian.

tabulophorum Stover *et al.*, 1977, p.333, pl.1, fig.12-13. Callovian.

STEPHODINIUM Deflandre, 1936a, p.58; emend. Davey, 1970, p.347.

"australicum" Cookson and Eisenack, 1962b, p.491, pl.2, fig.5-10. Clarke and Verdier, 1967, p.67 considered this species to be a *jr syn.* of *Stephodinium coronatum* Deflandre.

**coronatum* Deflandre, 1936a, p.58; text-fig.103. Senonian. See also *Stephodinium australicum* and *S. europaicum* which are *jr synonyms* of this species.

daveyi Below, 1982d, p.353-356, fig.28-37. Late Aptian.

dianneae Morgan, 1980, p.32, pl.27, fig.9-11; pl.28, fig.1-4. Aptian-Early Albian.

STEPHODINIUM **(cont'd)**

"europaicum" Cookson and Hughes, 1964, p.50, pl.8, fig.9-17. Clarke and Verdier, 1967, p.67 considered this species to be a *jr syn.* of *Stephodinium coronatum* Deflandre.

?pellucidum Deflandre, 1943, p.505,507; text-fig.12-16. ?Senonian. Stover and Evitt, 1978, p.193 considered this to be a "provisionally accepted species".

"spiniferum" (Cookson and Eisenack, 1965a). NOW *?Thalassiphora.*

spinulosum Duxbury, 1983, p.57-58, pl.5, fig.6,10,14; text-fig.25-26. Late Aptian-Early Albian.

STIPHROSPHAERIDIUM Davey, 1982b, p.16.

anthophorum (Cookson and Eisenack, 1958, p.43, pl.11, fig.12-13; text-fig.16-18) Davey, 1982b, p.18. Aptian-Albian. Originally *Hystrichosphaeridium;* subsequently *Oligosphaeridium.* See also *Polystephanephorus, Hystrichosphaerina, H. schindewolfii* and *Perisseiasphaeridium eisenackii.*

arbustum Davey, 1982b, p.17-18, pl.3, fig.1-4. Ryazanian.

**dictyophorum* (Cookson and Eisenack, 1958, p.44, pl.11, fig.14) Davey, 1982b, p.16. Late Jurassic. Originally *Hystrichosphaeridium;* subsequently *Oligosphaeridium.*

STOMODINIUM He Cheng-quan, 1984a, p.770 (translation p.774).

**crassum* He Cheng-quan, 1984a, p.770-771, pl.1, fig.12-14; text-fig.2. Early-Middle Eocene.

"SUBATHUA" Khanna and Singh, 1980, p.307-308. This genus is herein considered a *jr syn.* of *Thalassiphora.*

"balcanica" (Baltes, 1971). This species, considered to be a *jr syn.* of *Thalassiphora pelagica* by Stover and Evitt, 1978, p.194, was incorrectly transferred to *Subathua* by Khanna and Singh, 1980, p.308 (see I.C.B.N. Art.33, para.4).

*"*sahnii"* Khanna and Singh, 1980, p.308-309, pl.1, fig.1-3,5-9; text-fig.1-2. Eocene. This species is herein considered to be a *jr syn.* of *Thalassiphora pelagica.*

"spinosa" Khanna and Singh, 1980, p.309, pl.1, fig.10-12; text-fig.3. Eocene. This species is herein considered to be a *jr syn.* of *Thalassiphora pelagica.*

SUBTILIDINIUM Morgenroth, 1968, p.539.

**minutum* Morgenroth, 1968, p.539-540, pl.42, fig.8-9; pl.43, fig.1-2; text-fig. 3-4. Danian.

SUBTILISPHAERA Jain and Millepied, 1973, p.26-27; emend. Lentin and Williams, 1976, p.117-118.

"*asymmetrica*" ((Davey and Verdier, 1971, p.39-40, pl.2, fig.4,6) Lentin and Williams, 1976, p.119. NOW *Subtilisphaera deformans*. Originally *Deflandrea asymmetrica;* subsequently *Deflandrea deformans* Davey and Verdier.

balcattensis (Cookson and Eisenack, 1969, p.3,5, fig.1B-F) Lentin and Williams, 1976, p.119. Albian-Cenomanian; formerly *Deflandrea.*

cheit Below, 1981a, p.126-127, pl.9, fig.23-24; text-fig.85. Aptian-Vraconian.

crassigranulosa Jain and Millepied, 1973, p.28, pl.2, fig.25. Aptian.

"*cretacea*" (Pocock, 1962) Jain and Millepied, 1973, p.27. NOW and originally *Palaeoperidinium*. See also *Astrocysta* and *Lejeunia*. Lentin and Williams, 1975, p.2155 rejected the transfer of this species to *Subtilisphaera* by Jain and Millepied, 1973, p.27.

deformans (Davey and Verdier, 1973, p.197, *nom. nov. pro Deflandrea asymmetrica* Davey and Verdier, 1971, p.39-40, pl.2, fig.4,6 *non D. asymmetrica* Wilson, 1967a, p.62-63) Stover and Evitt, 1978, p.238. Middle Albian. Originally *Deflandrea asymmetrica;* subsequently *D. deformans,* then *Subtilisphaera asymmetrica.* See also *Deflandrea daveyi.*

dongyingense (Jiabo, 1978, p.82, pl.4, fig.6-9; pl.5, fig.1-6) Song Zhi-cheng and He Cheng-quan, 1982, p.735. Early Tertiary; formerly *Deflandrea.*

"*?euthema*" (Davey and Verdier) Lentin and Williams, 1976, p.119. NOW *Eurydinium;* formerly *Deflandrea.* At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Subtilisphaera.*

foliacea (Eisenack and Cookson, 1960, p.2, pl.1, fig.3) Stover and Evitt, 1978, p.239. Turonian-Middle Senonian. Originally *Deflandrea;* subsequently *Alterbia.*

hyalina Ch. Singh, 1983, p.161-162, pl.60, fig.3-9. Middle Cenomanian.

?inaffecta (Drugg, 1978, p.68, pl.3, fig.10-12) Bujak and Davies, 1983, p.163. Kimmeridgian; formerly *Geiselodinium.* Although we agree that this species should not be included in *Geiselodinium,* it cannot be unquestionably accepted in *Subtilisphaera.*

***SUBTILISPHAERA* (cont'd)**

"ovata" (Jiabo, 1978) Song Zhe-chen and He Cheng-quan, 1982, p.735. We reject this transfer from the genus *Deflandrea,* preferring to include the species in *Sanshuia,* following the recommendation of Yu Jingxian *et al.,* 1981.

?paeminosa (Drugg, 1978, p.68-69, pl.3, fig.5-9) Bujak and Davies, 1983, p.163. Middle Kimmeridgian; formerly *Geiselodinium.* Although we agree that this species should not be included in *Geiselodinium,* it cannot be unquestionably accepted in *Subtilisphaera.*

perlucida (Alberti, 1959b, p.102, pl.9, fig.16-17) Jain and Millepied, 1973, p.27. Late Barremian; formerly *Deflandrea.* See *Subtilisphaera rotundata.*

pirnaensis (Alberti, 1959b, p.100, pl.8, fig.1,5) Jain and Millepied, 1973, p.27. Middle Turonian; formerly *Deflandrea.*

pontis-mariae (Deflandre, 1936b, p.167, pl.2, fig.7-9) Lentin and Williams, 1976, p.119. ?Senonian. Originally *Gymnodinium;* subsequently *Deflandrea,* then *Ascodinium.*

rotundata (Eisenack and Cookson, 1960, p.2, pl.1, fig.1-2) Jain and Millepied, 1973, p.27. Albian; formerly *Deflandrea.* Lentin and Williams, 1976, p.119 did not agree with Davey, 1974, p.65 that *S. rotundata* is a *jr syn.* of *Subtilisphaera perlucida* (Alberti) Jain and Millepied. In Davey *op.cit.* the species are included in *Deflandrea.*

scabrata Jain and Millepied, 1973, p.28, pl.3, fig.36-39. Aptian.

**senegalensis* Jain and Millepied, 1973, p.27-28, pl.3, fig.31-33. Aptian.

"sverdrupiana" (Manum, 1963) Jain and Millepied, 1973, p.27. NOW *Spinidinium;* formerly *Deflandrea.* The transfer of this species to *Subtilisphaera* by Jain and Millepied, 1973, p.27 was rejected by Lentin and Williams, 1977b, p.157.

?terrula (Davey, 1974, p.65, pl.8, fig.4-5) Lentin and Williams, 1976, p.119. Middle Barremian; formerly *Deflandrea.* At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Subtilisphaera.*

?trendallii (Cookson and Eisenack, 1970a, p.145-146, pl.12, fig.5-6) Lentin and Williams, 1976, p.120. Albian-Cenomanian; formerly *Ascodinium.* O.C. At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Subtilisphaera.*

ventriosa (Alberti, 1959b. p.101, pl.9, fig.14-15) Jain and Millepied, 1973, p.27. Early Aptian; formerly *Deflandrea.*

SUBTILISPHAERA **(cont'd)**

zawia Below, 1981a, p.128-129, pl.9, fig.21-22; text-fig.82. Albian.

SUESSIA Morbey, 1975, p.38.

**swabiana* Morbey, 1975, p.39-40, pl.14, fig.5-11; pl.17, fig.4-9; text-fig. 12-15. Rhaetian.

SUIBINDIA Yu Jingxian, 1982, p.258-259.

ovata Yu Jingxian, 1982, p.259, pl.8, fig.25-26. Late Jurassic-Early Cretaceous.

**punctata* Yu Jingxian, 1982, p.259, pl.8, fig.12,23. Late Jurassic-Early Cretaceous.

SUMATRADINIUM Lentin and Williams, 1976, p.77-78.

"cephalum" (Kar, 1979) Jain, 1980, p.141. This transfer is herein rejected and the species is retained in *?Batiacasphaera*.

**hispidum* (Drugg, 1970a, p.120-121, fig.12-15) Lentin and Williams, 1976, p.77. Middle Miocene-Pliocene; formerly *Xenicodinium*.

SURCULOSPHAERIDIUM Davey *et al.*, 1966, p.160-161; emend. Davey, 1982b, p.15.

?alagoense (Regali *et al.*, 1974, p.290, pl.24, fig.2) Lentin and Williams, 1981, p.270. Middle Eocene-Miocene; formerly *Hystrichosphaeridium*. At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Surculosphaeridium*.

basifurcatum Yun, 1981, p.39-40, pl.16, fig.13-14; text-fig.10. Early Santonian.

belowi Yun, 1981, p.40-41, pl.16, fig.5,12; text-fig.11. Early Santonian.

cassospinum Yun, 1981, p.39, pl.16, fig.4,9,11. Early Santonian.

**cribrotubiferum* (Sarjeant, 1960a, p.137, pl.6, fig.2-3; text-fig.1) Davey *et al.*, 1966, p.161. Early Oxfordian; formerly *Hystrichosphaeridium*.

subsp. *granulosum* Jain, 1977, p.183, pl.6, fig.76. Early Albian.

divarispinosum Jain, 1977, p.183, pl.6, fig.77. Early Albian.

***SURCULOSPHAERIDIUM* (cont'd)**

?granulatum (W. Wetzel, 1952, p.404; text-fig.25) Sarjeant, 1984c, p.136, pl.5, fig.1-3; text-fig.8. Paleocene. Originally *Hystrichosphaeridium oligacanthum* subsp. *granulatum;* subsequently *Baltisphaeridium oligacanthum* subsp. *granulatum,* then *?Cleistosphaeridium oligacanthum* subsp. *granulatum.* At the time of the transfer, Sarjeant, 1984c, p.136 emended the diagnosis and raised the taxon to the species level.

granulosum Jain, 1977, p.182-183, pl.2, fig.17. Early Albian.

?longifurcatum (Firtion, 1952, p.157, pl.9, fig.1; text-fig.1H-M) Davey *et al.*, 1966, p.163. Cenomanian. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium.* Stover and Evitt, 1978, p.83 considered this to be a "provisionally accepted species".

phoenix (Duxbury, 1980, p.124-125, pl.13, fig.5-6; text-fig.9) Lentin and Williams, 1981, p.271. Barremian; formerly *Hystrichosphaeridium.* Sarjeant, 1984c, p.134 rejected the contention of Below, 1982d, p.350 that this species should be retained in *?Hystrichosphaeridium.*

subsp. *phoenix* Duxbury, 1980, p.124-125, pl.13, fig.5-6; text-fig.9. Barremian. Sarjeant, 1984c, p.134 was incorrect when he designated this taxon a *"subsp. nov."*

subsp. *stella* (W. Wetzel, 1952, p.403, pl.A, fig.4; text-fig.23) Sarjeant, 1984c, p.135. Paleocene. Originally *Hystrichosphaeridium oligacanthum* subsp. *stella;* subsequently *?Cleistosphaeridium oligacanthum* subsp. *stella.* At the time of the transfer, Sarjeant, 1984c, p.135 emended the diagnosis.

spinicongregatum Yun, 1981, p.40, pl.16, fig.2,6. Early Santonian.

trunculum Davey, 1979b, p.559-560, pl.8, fig.6-9. Aptian-Albian.

"?vestitum" (Deflandre, 1938b) Davey *et al.*, 1966, p.162. NOW *Systematophora.* Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium.* Stover and Evitt, 1978, p.83 considered this to be a "provisionally accepted species" of *Surculosphaeridium.*

SUSADINIUM Dörhöfer and Davies, 1980, p.28. See also *Facetodinium* which is a *jr syn.* of this genus.

faustum (Bjaerke, 1980) *comb. nov.*
1980 *Facetodinium faustum* Bjaerke, p.69, pl.2, fig.1-6; text-fig.4.
Toarcian.

inflatum (Bjaerke, 1980) *comb. nov.*
1980 *Facetodinium faustum* Bjaerke, p.69-71, pl.3, fig.1-13; text-fig.5.
Toarcian.

***SUSADINIUM* (cont'd)**

**scrofoides* Dörhöfer and Davies, 1980, p.28-29, fig.13; 24F,H-I,K; 25A-D. Toarcian-Bathonian.

SVALBARDELLA Manum, 1960, p.21.

"*australina*" (Cookson, 1965b). NOW *Palaeocystodinium*.

**cooksoniae* Manum, 1960, p.21-22, pl.1, fig.1-3; text-fig.2. Late Paleocene-Eocene.

"*granulata*" (Wilson, 1967b). NOW *Palaeocystodinium*.

hampdenensis Wilson, 1977, p.564-566, fig.1-8. Middle Eocene.

"*inflata*" (Rauscher and Doubinger, 1982). NOW *Andalusiella*.

"*polymorpha*" (Malloy, 1972). NOW *Andalusiella*.

"*rhomboides*" (Boltenhagen, 1977). NOW *Andalusiella*.

"*vozzhennikovae*" (Boltenhagen, 1977). NOW *Andalusiella*.

SVERDRUPIELLA Bujak and Fisher, 1976, p.45-48.

baccata Bujak and Fisher, 1976, p.48-49, pl.1, fig.5-7; text-fig.2B. Norian.

cristata Bujak and Fisher, 1976, p.51, pl.6, fig.4-7; text-fig.2F. ?Carnian-Norian.

downiei Bujak and Fisher, 1976, p.51, pl.7, fig.1-6; text-fig.2I. ?Carnian-Norian.

manicata Bujak and Fisher, 1976, p.50, pl.3, fig.8-11; text-fig.2G. Norian.

mutabilis Bujak and Fisher, 1976, p.50, pl.4, fig.1-12; pl.5, fig.1-10; pl.6, fig.1-3; text-fig.2J. ?Carnian-Norian.

ornaticingulata Bujak and Fisher, 1976, p.49, pl.1, fig.8-10; text-fig.2K. ?Carnian-Norian.

raiaformis Bujak and Fisher, 1976, p.50, pl.3, fig.4-7; text-fig.2D. ?Carnian-Norian.

sabinensis Bujak and Fisher, 1976, p.49, pl.3, fig.1-3; text-fig.2E. ?Carnian-Norian.

**septentrionalis* Bujak and Fisher, 1976, p.48, pl.1, fig.1-4; text-fig.2A. ?Carnian-Norian.

***SVERDRUPIELLA* (cont'd)**

spinosa Bujak and Fisher, 1976, p.51, pl.6, fig.8-10; text-fig.2C. ?Carnian-Norian.

usitata Bujak and Fisher, 1976, p.49, pl.2, fig.1-12; text-fig.2H. ?Carnian-Norian.

SYSTEMATOPHORA Klement, 1960, p.61-62. See also *Polystephanosphaera* which is a *jr syn.* of this genus.

ancyrea Cookson and Eisenack, 1965a, p.126, pl.14, fig.1-3. Late Eocene. Lentin and Williams, 1981, p.272 rejected the contention of Stover and Evitt, 1978, p.84 that this species is a *jr syn.* of *Systematophora placacantha*.

**areolata* Klement, 1960, p.62-65, pl.9, fig.1-8; text-fig.32-35. Early *Kimmeridgian*.

?austinii (Merrill, 1895, p.16, fig.11) Sarjeant, 1964b, p.175. Early Cretaceous; formerly *?Geodia*. At the time of the transfer, Sarjeant, *op.cit.* questionably included this species in *Systematophora*. Stover and Evitt, 1978, p.85 considered this to be a "problematical species".

"?capricorna" (Cookson and Eisenack, 1965) Eisenack, 1969, p.113. NOW *Areosphaeridium;* formerly *Cordosphaeridium*.

complicata Neale and Sarjeant, 1962, p.455-456, pl.19, fig.6-7. Late Hauterivian-Middle Barremian.

conspicua He Cheng-quan and Li Peng, 1981, p.68-69, pl.33, fig.10-12. Late Oligocene.

cretacea Davey, 1979b, p.560, pl.8, fig.10,13-15. Albian.

"fasciuligera" Klement, 1960, p.65, pl.9, fig.11-12. Middle Oxfordian-Early Kimmeridgian. *Jr syn.* of *Systematophora penicillata* according to Sarjeant, 1980a, p.282.

"iunctispina" (Klement, 1960) Stover and Evitt, 1978, p.84. NOW and formerly *Taeniophora*.

subsp. *"filamentosa"* (Klement, 1960) Stover and Evitt, 1978, p.84. NOW *Taeniophora filamentosa;* formerly *Taeniophora iunctispina* subsp. *filamentosa*.

subsp. *"iunctispina"* (Klement, 1960) Stover and Evitt, 1978, p.84. NOW and formerly *Taeniophora iunctispina* subsp. *iunctispina*.

"orbifera" (Klement, 1960). NOW *Hystrichosphaerina*.

SYSTEMATOPHORA (cont'd)

"?ovata" (Gitmez and Sarjeant, 1972). NOW *Egmontodinium*. Stover and Evitt, 1978, p.84 considered this to be a "provisionally accepted species" of *Systematophora*.

palmula Davey, 1982b, p.11-12, pl.1, fig.1-4. Ryazanian-Valanginian.

penicillata (Ehrenberg, 1843, p.61 *ex* 1845, pl.37, fig.8.3) Sarjeant, 1980a, p.282. Late Oxfordian. Originally *Xanthidium;* subsequently *Ovum hispidum,* then *Hystrichosphaera,* then *Hystrichosphaeridium.*

placacantha (Deflandre and Cookson, 1955, p.276, pl.9, fig.1-3) Davey *et al.*, 1969, p.17; emend. May, 1980, p.68. Miocene. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium,* then *Impletosphaeridium.* See also *Systematophora ancyrea.*

"schindewolfii" (Alberti, 1961) Downie and Sarjeant, 1965, p.146. NOW and formerly *Hystrichosphaerina.*

silyba Davey, 1979a, p.433-434,436, pl.48, fig.7-8; pl.50, fig.2-3,5-6,7-9. Barremian.

"turonica" (Alberti, 1961) Downie and Sarjeant, 1965, p.146. NOW and formerly *Hystrichosphaerina.*

valensii (Sarjeant, 1960a, p.142-143, pl.6, fig.5-7; text-fig.3c) Downie and Sarjeant, 1965, p.146. Late Oxfordian; formerly *Polystephanosphaera.*

?variabilis (Cookson and Eisenack, 1967a, p.134-135, pl.19, fig.9-11) Stover and Evitt, 1978, p.84. Paleocene; formerly *Cyclonephelium.* Stover and Evitt, *op.cit.* considered this to be a "provisionally accepted species".

"varians" (May, 1980). NOW *Hystrichosphaerina.*

vestita (Deflandre, 1938b, p.189, pl.11, fig.4-6) Davey, 1982b, p.13. Oxfordian. Originally *Hystrichosphaeridium;* subsequently *Baltisphaeridium,* then *?Surculosphaeridium.*

"vetuscula" (Davey, 1974) Duxbury, 1977, p.51. NOW *Nexosispinum;* formerly *Adnatosphaeridium.*

T

TAENIOPHORA Klement, 1960, p.67-68; emend. Sarjeant, 1984a, p.166-168. Stover and Evitt, 1978, p.84 considered this genus to be a *jr syn.* of *Systematophora* Klement. They accordingly transferred the type of the genus *Taeniophora*, *T. iunctispina*, to *Systematophora*. The remaining species, *Taeniophora linifera*, was transferred to the genus *Achomosphaera* by Stover and Evitt, 1978, p.138-139. After examining the type material of Klement, 1960, Sarjeant, 1984a disagreed with Stover and Evitt, *op.cit.* that *Taeniophora* is a *jr syn.* of *Systematophora*. Accordingly, he retained the two species, *T. iunctispina* and *T. filamentosa*, in *Taeniophora*.

filamentosa Klement, 1960, p.70, pl.10, fig.5-6; emend. Sarjeant and Gocht *in* Sarjeant, 1984a, p.169-170, pl.2, fig.3-4. Middle Oxforidian; formerly *Taeniophora iunctispina* subsp. *filamentosa*. See also *Systematophora iunctispina* subsp. *filamentosa*. At the time of the emendation Sarjeant and Gocht *in* Sarjeant, *op.cit.* raised this taxon to the species level.

*_iunctispina_ Klement, 1960, p.68-69, pl.10, fig.1-4; emend. Sarjeant and Gocht *in* Sarjeant, 1984a, p.168-169. Middle Oxfordian. See also *Systematophora*.

subsp. *"filamentosa"* (Klement, 1960). NOW *Taeniophora filamentosa*.

subsp. *iunctispina* Klement, 1960, p.69, pl.10, fig.1-4; emend. Sarjeant and Gocht *in* Sarjeant, 1984a, p.168-169. Middle Oxfordian. See also *"Systematophora iunctispina* subsp. *iunctispina"*.

"linifera" (Cookson and Eisenack, 1967b) Eisenack and Kjellström, 1971a, p.1019. NOW *Achomosphaera;* formerly *Baltisphaeridium*.

TALEISPHAERA Duxbury, 1979a, p.201. We herein reject the contention of Below, 1982c, p.13-17 that this genus is a *jr syn.* of *Kiokansium*, since that genus is characterized by an absence of parasutural features and the possession of nontabular processes. *Taleisphaera hydra*, the type of the genus, has penitabular arrangement of the processes.

*_hydra_ Duxbury, 1979a, p.201, pl.2, fig.1,4,6-7. Barremian. For the reasons given above, we herein reject the transfer of this species to *Kiokansium* by Below, 1982c, p.16.

TANYOSPHAERIDIUM Davey and Williams, 1966b, p.98.

boletum Davey, 1974, p.61-62, pl.6, fig.7. Barremian.

"ellipticum" (Cookson, 1965a) Davey and Williams, 1969, p.7. NOW *Distatodinium;* originally *Hystrichosphaeridium.*

fusiforum Matsuoka, 1974, p.332-333, pl.46, fig.4,9-10. Early-Middle Miocene.

isocalamus (Deflandre and Cookson, 1955, p.272, pl.2, fig.7-8; text-fig.30- 35) Davey and Williams, 1969, p.7. Early Cretaceous; formerly *Hystrichosphaeridium.* N.I.A.

"magdalium" (Drugg, 1967, p.26, pl.4, fig.8-10; pl.9, fig.7) Heisecke, 1970, p.244. Danian; formerly *Hystrichosphaeridium.* Stover and Evitt, 1978, p.85 considered this species to be a *jr syn.* of *Tanyosphaeridium xanthiopyxides.*

magneticum Davies, 1983, p.25, pl.8, fig.1-8,11-12; text-fig.20. Valanginian.

"paradoxum" (Brosius, 1963) Gocht, 1969, p.54. NOW *Bipolaribucina.* Originally *Hystrichosphaeridium;* subsequently *?Oligosphaeridium.* See also *Distatodinium.*

"prolixispinosum" (Davey and Williams, 1966b) Duxbury, 1980, p.132. NOW and formerly *Oligosphaeridium.*

regulare Davey and Williams, 1966b, p.99-100, pl.3, fig.4. Early Eocene.

salpinx Norvick, 1976, p.63-64, pl.9, fig.10. Cenomanian.

"tenerum" (Benedek, 1972). NOW *Distatodinium.*

"torynum" (Cookson and Eisenack, 1960b) Stover and Evitt, 1978, p.85. NOW *Egmontodinium.* Originally *Hystrichosphaeridium;* subsequently *?Prolixosphaeridium.*

**variecalamus* Davey and Williams, 1966b, p.98-99, pl.6, fig.7; text-fig.20. Cenomanian. N.I.A.

xanthiopyxides (O. Wetzel, 1933b, p.44, pl.4, fig.25; emend. Morgenroth, 1968, p.556) Stover and Evitt, 1978, p.85. Senonian. Originally *Hystrichosphaera;* subsequently *Hystrichosphaeridium,* then *Baltisphaeridium,* then *?Prolixosphaeridium.* See also *Tanyosphaeridium magdalium* which is a *jr syn.* of this species.

"TAPEINOSPHAERIDIUM" Ioannides *et al.*, 1977, p.461-462. *Jr syn.* of *Chytroeisphaeridia* according to Davey, 1979d, p.211.

"granulatum" (Ioannides *et al.*, 1977). NOW *Pyxidinopsis;* see also *?Tectatodinium.*

"TAPEINOSPHAERIDIUM" **(cont'd)**

"hyalinum" (Raynaud, 1978). NOW *Chytroeisphaeridia.*

*"*pericompsum"* (Ioannides *et al.,* 1977). NOW *Chytroeisphaeridia.*

TECTATODINIUM Wall, 1967, p.112-113.

"gochtii" (Dodekova, 1975). NOW *Dodekovia.*

"?granulatum" (Ioannides *et al.,* 1977) Davey, 1979d, p.217. NOW *Pyxidinopsis;* formerly *Tapeinosphaeridium.* At the time of the transfer, Davey, *op.cit.* questionably included this species in *Tectatodinium.*

"laminatum" (Davies, 1983). NOW *Pyxidinopsis.*

minutum Matsuoka, 1983b, p.127, pl.5, fig.6; pl.6, fig.7. Early-Middle Miocene.

"?nudum" (Nagy, 1969) Lentin and Williams, 1977b, p.161. NOW *?Tectatodinium pannonium.* Originally *Palaeoperidinium nudum;* subsequently *Palaeoperidinium pannonium,* then *?Gonyaulacysta nuda,* then *Tectatodinium nudum.* See also *Phthanoperidinium pannonium.* See discussion under *"Palaeoperidinium pannonium".* At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Tectatodinium.* This was an invalid transfer since this species is a *jr hom.* of *Palaeoperidinium nudum* Downie, 1957.

?pannonium (Lentin and Williams, 1973, p.106 *nom. subst. pro Palaeoperidinium nudum* Nagy, 1969 , p.291, pl.1, fig.1 *non Palaeoperidinium nudum* Downie, 1957) Lentin and Williams, 1981, p.275. Pannonian; also formerly *Palaeoperidinium pannonium, Phthanoperidinium pannonium, ?Gonyaulacysta nuda* and *?Tectatodinium nudum.* Lentin and Williams, 1973, p.106 retained the taxon in *Palaeoperidinium.*

**pellitum* Wall, 1967, p.113, pl.16, fig.11-12. Miocene-Holocene.

psilatum Wall and Dale *in* Wall *et al.,* 1973, p.22-23, pl.1, fig.9-15; pl.3, fig.1-6. Holocene.

"simplex" (Harland, 1979) Edwards, 1984, p.587. See *?Pyxidiella simplex.*

TENERIDINIUM Krutzsch, 1962, p.41.

**magnoides* Krutzsch, 1962, p.42, pl.10, fig.1-7; text-fig.1a. Eocene.

"TENUA" Eisenack, 1958, p.410; emend. Sarjeant, 1968, p.230-231. Lentin and Williams, 1973, p.135 rejected the emendation of this genus by Pocock, 1972, p.94, since the inclusion of smooth forms within *Tenua* would create a *jr syn.* of *Canningia* Cookson and Eisenack, 1960b. The emended circumscription of Pocock was otherwise similar to that of Sarjeant, 1968. Sarjeant and Stover, 1978, p.49 considered *Tenua* to be a *jr syn.* of the genus *Cyclonephelium.* The retention of *Tenua* by Davey, 1978, p.894, with *T. rioultii* as type species, was rejected by Lentin and Williams, 1981, p.276; the latter authors accepted the treatment of Sarjeant and Stover, 1978. Since *rioultii* is the type species of *Sentusidinium, Tenua* Davey, 1978 is a *jr syn.* of *Sentusidinium* and a *jr hom.* of *Tenua* Eisenack. The present generic assignments of the species of *"Tenua"* are given below.

"anaphrissa" (Sarjeant, 1966c) Benedek, 1972, p.9-10. Harker and Sarjeant, 1975, p.224 rejected the transfer of this species to *Tenua* and retained it in the genus *Doidyx* Sarjeant. Sarjeant and Stover, 1978, p.51 transferred this species from *Doidyx* to *Aptea.*

"aptiensis" (Burger, 1980a). NOW *Sentusidinium.*

"asymmetra" (Fenton *et al.,* 1980). NOW *Sentusidinium.*

"atlantica" (Habib, 1972). NOW *Fromea.*

"baculata" (Dodekova, 1975). NOW *Sentusidinium.*

"bellula" (Jiabo, 1978). NOW *?Kallosphaeridium.*

"bifidis" (Jiabo, 1978). NOW *?Cleistosphaeridium.*

"biornata" (Jiabo, 1978). NOW *Kallosphaeridium biparatum.*

subsp. *"biornata"* (Jiabo, 1978). NOW *Kallosphaeridium biparatum* subsp. *biparatum.*

subsp. *"crassa"* (Jiabo, 1978). NOW *Kallosphaeridium biparatum* subsp. *crassum.*

"brevispinosa" (Pocock, 1962) Brideaux, 1977, p.15. NOW *Cyclonephelium;* formerly *Palaeohystrichophora;* see also *?Canningia.* The transfer of this species to *Tenua* by Brideaux, 1977, p.15 necessitated the transfer to *Cyclonephelium* by Lentin and Williams, 1981, p.276.

"capillata" (Davey, 1975). NOW *Sentusidinium.*

"capitata" (Cookson and Eisenack, 1960b) Gitmez and Sarjeant, 1972, p.189. NOW *Prolixosphaeridium.* Originally *Hystrichosphaeridium.*

"colligata" (Morgan, 1980). NOW *Epelidosphaeridia.*

"TENUA" (cont'd)

"dubia" (Jain and Millepied, 1975). NOW *Cyclonephelium.*

"echinata" (Gitmez and Sarjeant, 1972). NOW *Sentusidinium.*

"eisenackii" (Boltenhagen, 1977). NOW *Sentusidinium.*

var. *"vermiculata"* (Boltenhagen, 1977). NOW *Sentusidinium eisenackii* subsp. *vermiculatum.*

"evittii" (Pocock, 1972). NOW *Glomodinium.*

"hystricella" Eisenack, 1958, p.411, pl.23, fig.5-7. Eisenack and Kjellström, 1971a, p.1039 and Brideaux and McIntyre, 1975, p.24 considered this species to be a *jr syn.* of *Tenua hystrix* Eisenack.

*"*hystrix"* (Eisenack, 1958). NOW *Cyclonephelium.*

subsp. *"minor"* (Jiabo, 1978). NOW *?Kallosphaeridium minor.*

"microcysta" (Bujak, 1980). NOW *Cleistosphaeridium.*

"microrobusta" (Morgan, 1980). NOW *Sentusidinium.*

"neophytensa" (Ioannides *et al.*, 1977). NOW *?Sentusidinium.*

"pilosa" (Ehrenberg, 1854) Sarjeant, 1968, p.231. NOW *Sentusidinium.* Originally *Xanthidium;* subsequently *Ovum hispidum,* then *Hystrichosphaera,* then *Hystrichosphaeridium,* then *Baltisphaeridium,* then *Cleistosphaeridium.*

subsp. *"longispinosa"* (Sarjeant, 1961a, p.102, pl.14, fig.8) Lentin and Williams, 1973, p.136; formerly *Baltisphaeridium pilosum* var. *longispinosum.* Sarjeant, 1976c, p.19 considered this taxon to be a *jr syn.* of the species *Prolixosphaeridium granulosum* (Deflandre) Davey *et al.* Erkmen and Sarjeant, 1980, p.64-65 considered this taxon to be synonymous with *Prolixosphaeridium anasillum.*

"rioultii" (Sarjeant, 1968). NOW *Sentusidinium.*

"taugourdeaui" (Varma and Dangwal, 1964). See *?Hemicystodinium taugourdeaui.*

"varispinosa" (Sarjeant, 1959) Sarjeant, 1972, p.43. NOW *Cleistosphaeridium;* formerly *Baltisphaeridium.* See also *?Sentusidinium.*

"verrucosa" (Sarjeant, 1968). NOW *Sentusidinium.*

"villersensis" (Sarjeant, 1968). NOW *Sentusidinium.*

TETRANGULADINIUM Yu Jingxian *et al.*, 1983, p.68.

**conspicum* Yu Jingxian *et al.*, 1983, p.68, pl.30, fig. 2-6. Cretaceous.

cruciforme Yu Jingxian *et al.*, 1983, p.69, pl.29, fig.6-8; pl.30, fig.1. Cretaceous.

"TETRASPHAERA" Gorka, 1965, p.307 *non Tetrasphaera* Popofsky, 1912. NOW *Gorkadinium.*

*"*rara"* (Gorka, 1965). NOW *Gorkadinium.*

THALASSIPHORA Eisenack and Gocht, 1960, p.513; emend. Gocht, 1968, p.153; emend. Benedek and Gocht, 1981, p.59. See the discussion under the genus *Disphaeria* Cookson and Eisenack. See also *Erikania* and *Subathua* which are *jr synonyms* of this genus.

"balcanica" Baltes, 1971, p.6, pl.3, fig.3-7. Early Pliocene. *Jr syn.* of *Thalassiphora pelagica* according to Stover and Evitt, 1978, p.194. The transfer of this species to *Disphaeria* by Norvick, 1976, p.99 was rejected by Lentin and Williams, 1977b, p.162, because of the uncertainty of the archeopyle type in that genus. See also *Subathua.*

bononiensis Corradini, 1973, p.185-186, pl.30, fig.5,6a-b,8a-b; pl.37, fig.5a-b; pl.38, fig.1; pl.39, fig.1. Late Cretaceous-Paleocene. The transfer of this species to *Disphaeria* Cookson and Eisenack by Yun, 1981, p.70 is herein rejected and the species is retained in *Thalassiphora.*

decrementa Islam, 1983b, p.343-344, pl.4, fig.4-5; text-fig.7. Middle Eocene.

"defloccata" (Davey and Verdier) Lentin and Williams, 1976, p.85. NOW *Leberidocysta;* formerly *Hexagonifera.*

delicata Williams and Downie, 1966c, p.235, pl.26, fig.8; emend. Eaton, 1976, p.287. Early Eocene. See also the discussion under the genus *Disphaeria* Cookson and Eisenack.

dynamica (Morgenroth, 1966a, p.27-28, pl.6, fig.7-8) Stover and Evitt, 1978, p.195. Early Eocene; formerly *Erikania.* We herein reject the contention of Yun, 1981, p.70 that this species is a *jr syn.* of *Disphaeria munda* (Davey and Verdier) Norvick.

fenestrata Liengjarern *et al.*, 1980, p.489, pl.54, fig.1. Late Eocene-Early Oligocene.

flammea Cookson and Eisenack, 1967b, p.252-253, pl.42, fig.1-5. Late Paleocene. The transfer of this species to *Disphaeria* Cookson and Eisenack by Yun, 1981, p.70 is herein rejected and the species is retained in *Thalassiphora.*

***THALASSIPHORA* (cont'd)**

?maxima Jain and Millepied, 1975, p.146, pl.4, fig.53-54. Campanian-Maastrichtian. Stover and Evitt, 1978, p.195 considered this to be a "provisionally accepted species". The transfer of this species to *Disphaeria* Cookson and Eisenack by Yun, 1981, p.70 is herein rejected and the species is retained in *?Thalassiphora*.

microcysta Ch. Singh, 1983, p.153-154, pl.56, fig.7-8; pl.57, fig.1. Early Cenomanian.

"munda" (Davey and Verdier, 1973). NOW *Disphaeria*. The retention of this species in *Thalassiphora* by Stover and Evitt, 1978, p.195 was rejected by Lentin and Williams, 1981, p.90.

?pansa Stover, 1977, p.78-79, pl.2, fig.32-38. Middle-Late Oligocene. Stover, *op.cit.* questionably included this species in *Thalassiphora*.

patula (Williams and Downie, 1966c, p.217, pl.24, fig.2; text-fig.58) Stover and Evitt, 1978, p.195. Early Eocene; formerly *?Adnatosphaeridium*. Benedek and Gocht, 1981, p.59 considered this species to be a *jr syn.* of *Thalassiphora pelagica* (Eisenack) Eisenack and Gocht. We herein reject this opinion in view of the distinctive morphology of *T. patula*. The transfer of this species from *?Adnatosphaeridium* to *Thalassiphora* is not attributable to Bujak *et al.*, 1980, p.36.

**pelagica* (Eisenack, 1954, p.71, pl.12, fig.17-18) Eisenack and Gocht, 1960, p.513-514; emend. Benedek and Gocht, 1981, p.59-61. Late Eocene-Early Oligocene; formerly *Pterospermopsis*. See also the discussion under the genus *Disphaeria* Cookson and Eisenack. See *Thalassiphora patula*. See also *Subathua sahnii*, *S. spinosa*, *Thalassiphora sueroi* and *T. velata* which are *jr synonyms* of this species.

?petila Corradini, 1973, p.186, pl.31, fig.1-2. Senonian. Corradini, *op.cit.* questionably included this species in *Thalassiphora*. The transfer of this species to *Disphaeria* Cookson and Eisenack by Yun, 1981, p.70 is herein rejected and the species is retained in *?Thalassiphora*.

reticulata Morgenroth, 1966b, p.6-7, pl.2, fig.1-2. Early Oligocene. See also the discussion under the genus *Disphaeria* Cookson and Eisenack.

salvadorensis (Regali *et al.*, 1974, p. 290, pl.23, fig.1) Lentin and Williams, 1981, p.279. Eocene; formerly *Hystrichosphaeridium*.

?spinifera (Cookson and Eisenack, 1965a, p.124-125, pl.14, fig.10) Stover and Evitt, 1978, p.195. Late Eocene; formerly *Stephodinium*. Stover and Evitt, 1978, p.195 considered this to be a "provisionally accepted species".

succincta Morgenroth, 1966b, p.7-8, pl.2, fig.7-9. Early Oligocene. See also the discussion under the genus *Disphaeria* Cookson and Eisenack and *Disphaeria succincta*.

THALASSIPHORA **(cont'd)**

"sueroi" Pöthe de Baldis, 1966, p.224-225, pl.2, fig.d. Early Tertiary. *Jr syn.* of *Thalassiphora pelagica* according to Stover and Evitt, 1978, p.194. The transfer of this species to *Disphaeria* Cookson and Eisenack by Yun, 1981, p.70 is herein rejected.

"velata" (Deflandre and Cookson, 1955, p.291, pl.8, fig.8) Eisenack and Gocht, 1960, p.514-515. Early Tertiary; formerly *Pterocystidiopsis*. Benedek and Gocht, 1981, p.59 and Sarjeant, 1981, p.117 considered this species to be a *jr syn.* of *Thalassiphora pelagica* (Eisenack) Eisenack and Gocht. The transfer of this species to *Disphaeria* Cookson and Eisenack by Yun, 1981, p.70 was therefore superfluous.

"THULEDINIUM" Pocock and Sarjeant, 1972, p.352. Pocock and Sarjeant, *op.cit.* considered this genus to be an acritarch. Davey, 1979c, p.64 stated that *Thuledinium* was a *jr syn.* of *Mendicodinium.* He accordingly transferred the type of the genus and single species, *Thuledinium groenlandicum,* to *Mendicodinium.*

"TITYROSPHAERIDIUM" Sarjeant, 1981, p.120. Sarjeant, *op.cit.* designated *"Tityrosphaeridium cantharellum"* as the type of the genus. According to Sarjeant, 1981, this genus differs from *Cordosphaeridium* in having cingular processes. However, his text-fig.1 clearly indicates cingular processes on the holotype of *Cordosphaeridium inodes;* therefore the generic separation cannot be maintained and the genus *Tityrosphaeridium* is herein considered to be a *jr syn.* of *Cordosphaeridium.* All the species transferred to *Tityrosphaeridium* by Sarjeant, 1981, p.120-121 are retained in *Cordosphaeridium* with the exception of *"T. latispinosum"* which is now included in *Achilleodinium* and *"T. truncigerum"* which is now included in *Pervosphaeridium.* See below for listing of individual species.

"?biarmatum" (Morgenroth, 1966a) Sarjeant, 1981, p.121. NOW and formerly *Cordosphaeridium.* At the time of the transfer, Sarjeant, *op.cit.* questionably included this species in *Tityrosphaeridium.*

"callosum" (Morgenroth, 1966a) Sarjeant, 1981, p.121. NOW and formerly *Cordosphaeridium.* At the time of the transfer, Sarjeant, *op.cit.* questionably included this species in *Tityrosphaeridium.*

*"*cantharellum"* (Brosius, 1963) Sarjeant, 1981, p.120. NOW and formerly *Cordosphaeridium.* Originally *Hystrichosphaeridium.*

"?funiculatum" (Morgenroth, 1966a) Sarjeant, 1981, p.121. NOW and formerly *Cordosphaeridium.* At the time of the transfer, Sarjeant, *op.cit.* questionably included this species in *Tityrosphaeridium.*

"gracile" (Eisenack, 1954) Sarjeant, 1981, p.121. NOW and formerly *Cordosphaeridium.* Originally *Hystrichosphaeridium inodes* var. *gracile.*

"TITYROSPHAERIDIUM" **(cont'd)**

"?latispinosum" (Davey and Williams, 1966b) Sarjeant, 1981, p.121. NOW *Achilleodinium;* formerly *Cordosphaeridium.* At the time of the transfer, Sarjeant, *op.cit.* questionably included this species in *Tityrosphaeridium.*

"porosispinum" (Davey, 1982) Norris and Jux, 1984, p.160. The transfer of this species to *Tityrosphaeridium* is herein rejected and it is retained in the genus *Kleithriasphaeridium.*

"?senegalense" (Jain and Millepied, 1975) Sarjeant, 1981, p.121. NOW and formerly *Cordosphaeridium.* At the time of the transfer, Sarjeant, *op.cit.* questionably included this species in *Tityrosphaeridium.*

"?tenuistriatum" (Heisecke, 1970) Sarjeant, 1981, p.121. NOW and formerly *Cordosphaeridium.* At the time of the transfer, Sarjeant, *op.cit.* questionably included this species in *Tityrosphaeridium.*

"?truncigerum" (Deflandre, 1937b) Sarjeant, 1981, p.121. NOW *Pervosphaeridium.* Originally *Hystrichosphaeridium;* subsequently *?Litosphaeridium,* then *Cordosphaeridium.* At the time of the transfer, Sarjeant, *op.cit.* questionably included this species in *Tityrosphaeridium.*

"TOENISBERGIA" Benedek *et al.,* 1982, p.279. Benedek *et al., op.cit.* stated that *Toenisbergia* has an intercalary archeopyle; their illustrations, however, fail to confirm this. We herein consider *Toenisbergia* to have a precingular archeopyle and accordingly regard it as a *jr syn.* of the genus *Pentadinium.*

*"*imaginatum"* (Benedek, 1972, p.43-44, pl.2, fig.11; pl.6, fig.9) Benedek *et al.,* 1982, p.279-283, fig.7A,C,E (holotype), fig.6A,C,E (paratype). The holotype is the holotype of *Pentadinium taeniagerum* subsp. *imaginatum;* the paratype is the holotype of *Pentadinium laticinctum* subsp. *imaginatum.* We herein reject the opinion of Benedek *et al., op. cit.,* that these subspecies are synonymous and that *Toenisbergia* is a distinct and separate genus. Accordingly, we retain both subspecies as distinct and separate subspecies of *Pentadinium laticinctum* and *Pentadinium taeniagerum* respectively.

"TOOLONGIA" Cookson and Eisenack, 1960a, p.14. *Jr syn.* of *Dinopterygium* according to Stover and Evitt, 1978, p.205. These authors transferred the type and single species of the genus, *Toolongia medusoides,* to *Dinopterygium.*

TRABECULIDIUM Duxbury, 1980, p.132-133.

elegantulum (Drugg, 1967, p.25, pl.4, fig.17) Duxbury, 1980, p.134. Danian; formerly *Cannosphaeropsis.*

***TRABECULIDIUM* (cont'd)**

pusulosa (Morgenroth, 1966b, p.8, pl.2, fig.6) Duxbury, 1980, p.134. Early Oligocene. Originally *Cannosphaeropsis;* subsequently *Nematosphaeropsis.*

**quinquetrum* Duxbury, 1980, p.133-134, pl.9, fig.1-2,5. Barremian.

TRIBLASTULA O. Wetzel, 1933b, p.54; emend. Morgenroth, 1966a, p.15; emend. Eisenack, 1969, p.107.

"borussica" (Eisenack, 1954) Morgenroth, 1966a, p.15-16. NOW and formerly *Rottnestia.* Originally *Hystrichosphaera;* subsequently *Hystrichosphaeropsis.* The above transfer was rejected by Eisenack, 1969, p.105-108, but upheld by May, 1980, p.70 and Yun, 1981, p.22.

nuda O. Wetzel, 1961, p.340, pl.2, fig.2. Erratic, ?Late Cretaceous. Gocht, 1976, p.322 questionably considered this species to be a synonym of *Hystrichosphaeropsis quasicribrata* (O. Wetzel) Gocht. Stover and Evitt, 1978, p.196 concurred with Gocht's opinion.

"quasicribrata" (O. Wetzel, 1961). NOW *Hystrichosphaeropsis.*

tubulata O. Wetzel, 1961, p.340, pl.2, fig.4. Erratic, ?Late Cretaceous. Gocht, 1976, p.322 questionably considered this species to be a synonym of *Hystrichosphaeropsis quasicribrata* (O. Wetzel) Gocht. Stover and Evitt, 1978, p.196 concurred with Gocht's opinion.

**utinensis* O. Wetzel, 1933b, p.54, pl.6, fig.5-6. Erratic, Cretaceous.

TRICHODINIUM Eisenack and Cookson, 1960, p.5; emend. Clarke and Verdier, 1967, p.18-19.

bifurcatum Jain and Millepied, 1975, p.140-141, pl.1, fig.14-16. Maastrichtian.

castanea (Deflandre, 1935, p.229, pl.6, fig.8) Clarke and Verdier, 1967, p.19-20. Erratic, ?Senonian; formerly *Palaeoperidinium.* N.I.A. See also *Trichodinium ciliatum* which is a *jr syn.* of this species.

chilense Troncoso and Doubinger, 1980, p.96-97, pl.1, fig.14. Maastrichtian-Danian.

"ciliatum" (Gocht, 1959, p.65, pl.8, fig.5-6) Eisenack, 1964, p.811. Late Hauterivian; formerly *Apteodinium.* Clarke and Verdier, 1967, p.19 considered this species to be a *jr syn.* of *Trichodinium castaneum* (Deflandre) Clarke and Verdier.

delicatum Davey, 1975, p.156-157, pl.2, fig.8-9,11-12. Senonian (probably Campanian).

TRICHODINIUM **(cont'd)**

eisenackii Burger, 1980a, p.81, pl.37, fig.1,4. Aptian.

erinaceoides Davies, 1983, p.21-22, pl.6, fig.6-15; text-fig.17. Late Tithonian-Early Valanginian.

hirsutum Cookson, 1965b, p.139, pl.25, fig.5-13. Paleocene.

intermedium Eisenack and Cookson, 1960, p.6, pl.2, fig.5-6. Clarke and Verdier, 1967, p.19 considered this species to be a *jr syn.* of *Trichodinium castaneum* (Deflandre) Clarke and Verdier. Morgan, 1980, p.33 regarded *T. intermedium* as a distinct and separate species.

magnum Jain, 1977, p.175-176, pl.4, fig.40-42. Early Albian.

paucispinum Eisenack and Cookson, 1960, p.5-6, pl.2, fig.7. Albian. Lentin and Williams, 1981, p.281 rejected the transfer of this species to the genus *Occisucysta* Gitmez by Below, 1981a, p.60.

**pellitum* Eisenack and Cookson, 1960, p.5, pl.2, fig.4. Aptian.

?*rhomboidale* (Gorka, 1965, p.301-302, pl.1, fig.6) Lentin and Williams, 1976, p.111. Early Kimmeridgian; formerly *Palaeoperidinium*. At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Trichodinium*. Sarjeant, 1967, p.256 recommended transfer of this species to *Trichodinium*. Stover and Evitt, 1978, p.196-197 considered this to be a "provisionally accepted species".

speetonense Davey, 1974, p.63, pl.7, fig.2-3. Barremian. Lentin and Williams, 1981, p.281 rejected the transfer of this species to the genus ?*Occisucysta* Gitmez by Below, 1981a, p.60.

spinosum Ch. Singh, 1971, p.316-317, pl.48, fig.8-9. Late Albian.

TRIGONOPYXIDIA Cookson and Eisenack, 1961a, p.75 *(nom. subst. pro Trigonopyxis* Cookson and Eisenack, 1960a, p.11, *non* Penard, 1912.)

**ginella* (Cookson and Eisenack, 1960a, p.11, pl.3, fig.18-20) Downie and Sarjeant, 1965, p.149. ?Late Albian-Cenomanian; formerly *Trigonopyxis*.

microreticulata Jiabo, 1978, p.124-125, pl.43, fig.1. Early Tertiary.

"TRIGONOPYXIS" Cookson and Eisenack, 1960a, p.11 *non* Penard, 1912. NOW *Trigonopyxidia*.

TRINOVANTEDINIUM Reid, 1977, p.436-437; emend. Harland, 1977b, p.108; emend. Bujak, 1984, p.193. Harland, 1982a, p.397 designated *Trinovantedinium* as a section of the subgenus *Protoperidinium* (Berg) Balech, 1974. Bradford and Wall, 1984, p.48 suggested that this genus may be a *jr syn.* of *Vozzhennikovia* Lentin and Williams.

TRINOVANTEDINIUM **(cont'd)**

applanatum (Bradford, 1977, p.47-49, fig.2:1-8) Bujak and Davies, 1983, p.163. Recent. Originally *Lejeunia;* subsequently *Lejeunecysta.* Matsuoka, 1984b, p.6 believed that this species is a *syn.* of *Trinovantedinium capitatum* Reid. Bradford and Wall, 1984, p.48-49 considered this species to represent the encysted stage of *Protoperidinium pentagonum* (Gran) Balech, 1974.

boreale Bujak, 1984, p.193-194, pl.4, fig.1-4. Late Eocene.

**capitatum* Reid, 1977, p.437-438, pl.1, fig.6-8. Recent. Harland, 1981, p.68 and Lewis *et al.*, 1984, p.31 considered this species to represent the encysted stage of *Protoperidinium pentagonum* (Gran) Balech, 1974. Matsuoka, 1984b, p.6 believed this species to be a *syn.* of *Trinovantedinium applanata* (Bradford) Bujak and Davies.

"concretum" (Reid, 1977). NOW *Quinquecuspis.*

"olivum" Reid, 1977, p.439-440, pl.1, fig.12-14; pl.2, fig.18. Recent. *Jr syn.* of *Lejeunecysta paratenella* according to Harland, 1977b, p.105.

"sabrinum" (Reid, 1977). NOW *Lejeunecysta.* Harland, 1981, p.68 considered this species to represent the encysted stage of *Protoperidinium leonis* (Pavillard) Balech, 1974.

"TRIOPERCULODINIUM" Drugg, 1970b, p.820. Wall and Dale in Wall *et al.*, 1973, p.24 considered this genus to be a *jr syn.* of *Lingulodinium* Wall. The type and single species of the genus, *"Trioperculodinium siculum"*, is accordingly included in *Lingulodinium.*

TRITHYRODINIUM Drugg, 1967, p.20; emend. Lentin and Williams, 1976, p.98-100.

druggii Stone, 1973, p.54-55, pl.5, fig.18-19a. Late Campanian.

dubium Ch. Singh, 1983, p.137, pl.47, fig.8-10. Middle Cenomanian.

**evittii* Drugg, 1967, p.20, pl.3, fig.2-3; pl.9, fig.2. Danian.

fragile Davey, 1969b, p.11, pl.3, fig.6,9. Maastrichtian-?Danian.

"ornatum" (Felix and Burbridge, 1973). NOW *Ginginodinium.*

pentagonum May, 1980, p.87-88, pl.10, fig.13-14. Maastrichtian.

rhomboideum Ch. Singh, 1983, p.136-137, pl.46, fig.11-13; pl.47, fig.1-7. Middle Cenomanian.

"robustum" (Benson, 1976). NOW *?Chatangiella.*

TRITHYRODINIUM **(cont'd)**

striatum Benson, 1976, p.197-198, pl.11, fig.4-8. Late Maastrichtian.

suspectum (Manum and Cookson, 1964, p.9-10, pl.1, fig.9-13) Davey, 1969b, p.12. Cenomanian; formerly *Hexagonifera.*

unicorniculum Davey, 1975, p.158-159, pl.3, fig.6-7. Senonian (probably Campanian).

vermiculatum (Cookson and Eisenack, 1961a, p.74, pl.12, fig.6-8) Lentin and Williams, 1976, p.100. Senonian; formerly *Hexagonifera.*

TRIVALVADINIUM Islam, 1983b, p.344,346.

**formosum* Islam, 1983b, p.346, pl.4, fig.9. Middle Eocene.

plenum Islam, 1983c, p.90, pl.4, fig.4-6. Early Eocene.

TUBERCULODINIUM Wall, 1967, p.114.

paraense (Regali *et al.*, 1974, p.289, pl.23, fig.6) Lentin and Williams, 1981, p.282. Early Miocene; formerly *Hystrichosphaeridium.*

rossignoliae Drugg, 1970a, p.116-118, fig.3,10-11. Early Miocene. O.C.

**vancampoae* (Rossignol, 1962, p.134, pl.2, fig.1) Wall, 1967, p.114-115. Pleistocene; formerly *?Pterospermopsis.* Lentin and Williams, 1973, p.139 rejected the transfer of this species to the modern genus *Pyrophacus* by Wall and Dale, 1971, p.234-235, because the thecal equivalent of the type material is unknown.

wallii Drugg, 1970a, p.115-116, fig.1,4-6. Post Miocene.

TUBIDERMODINIUM Morgenroth, 1966a, p.16.

**sulcatum* Morgenroth, 1966a, p.16-17, pl.3, fig.4-6. Early Eocene.

TUBOTUBERELLA Vozzhennikova, 1967, p.179-180; emend. Brideaux, 1977, p.36; emend. Sarjeant, 1982, p.41. See also *Dimidiadinium* and *Glabridinium* which are *jr synonyms* of this genus.

apatela (Cookson and Eisenack, 1960b, p.249, pl.37, fig.12-13) Ioannides *et al.*, 1977, p.464; emend. Sarjeant, 1982, p.42. Late Jurassic. Originally *Scriniodinium;* subsequently *Psaligonyaulax.* See also *Glabridinium.*

dangeardii (Sarjeant, 1968, p.226-227, pl.1, fig.21; pl.3, fig.8-15; text-fig.3) Stover and Evitt, 1978, p.197; emend. Sarjeant, 1982, p.42-43. Oxfordian; formerly *Gonyaulacysta.* See also *Dimidiadinium.*

TUBOTUBERELLA dangeardii **(cont'd)**

subsp. *dangeardii* (Sarjeant, 1968, p.226-227, pl.1, fig.21; pl.3, fig.8-15; text-fig.3) Stover and Evitt, 1978, p.197; emend. Sarjeant, 1982, p.42-43. Oxfordian; formerly *Gonyaulacysta*. See also *Dimidiadinium*. The subsp. *Tubotuberella dangeardii* subsp. *dangeardii* is not attributable to Sarjeant, 1982, p.43. See I.C.B.N. Art. 26 for the ruling on autonyms.

subsp. *primitiva* Sarjeant, 1982, p.44, pl.7, fig.3-4,9-10; text-fig.5a-b. Bathonian.

dentata Raynaud, 1978, p.395, pl.2, fig.13. Callovian.

egemenii (Gitmez, 1970, p.272-274, pl.10, fig.5-6; text-fig.18) Stover and Evitt, 1978, p.197. Early Kimmeridgian; formerly *Leptodinium*.

"*eisenackii*" (Deflandre, 1938b) Stover and Evitt, 1978, p.197. NOW and formerly *Gonyaulacysta*. Originally *Gonyaulax*. See also *Endoscrinium*.

subsp. "*oligodentata*" (Cookson and Eisenack, 1958, p.30, pl.2, fig.11) Stover and Evitt, 1978, p.198. Late Jurassic; formerly *Endoscrinium eisenackii* subsp. *oligodentatum*. According to Sarjeant, 1982, p.32, this taxon is a *jr syn.* of *Gonyaulacysta eisenackii* subsp. *eisenackii*.

irregularis (Cookson and Eisenack, 1958, p.28-29, pl.10, fig.1-2) Davies, 1983, p.23. Late Jurassic. Originally *Wetzeliella*, subsequently ?*Scriniodinium*.

lurida (Deflandre, 1938b, p.166, pl.5, fig.4-6) Davies, 1983, p.24. Early Oxfordian. Originally *Gymnodinium*; subsequently *Scriniodinium*, then *Endoscrinium*.

**rhombiformis* Vozzhennikova, 1967, p.180, pl.101, fig.1-2; pl.102, fig.1-3; pl.104, fig.1-3; emend. Brideaux, 1977, p.36. Late Jurassic. O.C. Contrary to the statements of Stover and Evitt, 1978, p.197, Vozzhennikova, 1967, p.180 cited only one specimen for the holotype.

sphaerocephalis Vozzhennikova, 1967, p.181, pl.103, fig.1-3; pl.104, fig.4,5a-b. Late Jurassic. See also *Dimidiadinium*. Davies, 1983, p.23 retained this species in *Tubotuberella*.

uncinata (Brideaux, 1977, p.38-39, pl.15, fig.2-5,7-8) Davies, 1983, p.24. Hauterivian-Barremian; formerly *Dimidiadinium*.

whatleyi (Sarjeant, 1972, p.19-21, pl.7, fig.1; text-fig.4) Stover and Evitt, 1978, p.198. Bathonian-Middle Callovian; formerly *Gonyaulacysta*.

TUBULIFERA Schumacker-Lambry, 1978, p.52-53.

**heterosolenia* Schumacker-Lambry, 1978, p.53, pl.8, fig.4-7. Paleocene (Landenian).

TURBIOSPHAERA Archangelsky, 1969a, p.408.

**filosa* (Wilson, 1967a, p.66, fig.2,31-32,34) Archangelsky, 1969a, p.408-411. Paleocene-Oligocene; formerly *Cordosphaeridium*.

galatea Eaton, 1976, p.289, pl.15, fig.4-6. Early Eocene.

magnifica Eaton, 1976, p.290, pl.15, fig.7-9. Middle Eocene.

symmetrica Bujak *in* Bujak *et al.*, 1980, p.90, pl.22, fig.6-8. Late Eocene.

U

UMBODINIUM Bint, 1983, p.173-175.

**crustov* Bint, 1983, p.175-176,178, pl.1, fig.1-12; text-fig.2A-B,3F,4. Late Albian.

UVATODINIUM Vozzhennikova, 1963, p.182.

marginatum Vozzhennikova, 1967, p.51-52, pl.8, fig.1-2. Paleocene.

**nasutum* Vozzhennikova, 1963, p.182; text-fig.13a-b. Paleocene.

V

VALENSIELLA Eisenack, 1963a, p.100-101. See also *Favilarnax* which is a *jr syn.* of this genus.

?amandopolitana (Valensi, 1955b, p.590, pl.2, fig.7; pl.5, fig.2) Eisenack, 1963a, p.102. Middle Jurassic. Originally *Membranilarnax;* subsequently *Favilarnax.* Stover and Evitt, 1978, p.86 considered this to be a "provisionally accepted species".

ampulla Gocht, 1970b, p.149-150, pl.34, fig.7-9; text-fig.19a. Early Bathonian.

?clathroderma (Deflandre and Cookson, 1955, p.290, pl.7, fig.6; text-fig.51) Eisenack, 1963a, p.101. ?Early Eocene; formerly *Membranilarnax.* Stover and Evitt, 1978, p.86 considered this to be a "provisionally accepted species". See also *Membranilarnacia densa* which is a *jr syn.* of this species.

griphus Norvick, 1976, p.75-76, pl.8, fig.6-7; pl.10, fig.7-9. Cenomanian.

**ovula* (Deflandre, 1947c, p.9, text-fig.22-23) Eisenack, 1963a, p.101. Bajocian. Originally *Membranilarnax;* subsequently *Favilarnax.*

punctata Jain, 1977, p.180, pl.4, fig.44. Early Albian.

undulata Jiabo, 1978, p.92, pl.27, fig.11-12. Early Tertiary.

vermiculata Gocht, 1970b, p.150, pl.34, fig.10-11; text-fig.19d. Early Bathonian.

VALVAEODINIUM Morgenroth, 1970, p.350.

**armatum* Morgenroth, 1970, p.350-351, pl.11, fig.1-5. Late Pliensbachian.

VECTIDINIUM Liengjarern *et al.,* 1980, p.490. Islam, 1982, p.313 considered this genus to be a *jr syn.* of *Phthanoperidinium* and transferred the type and only species, *V. stoveri,* to *Phthanoperidinium.* We herein refute this transfer and retain the genus *Vectidinium,* since the illustration of the holotype of *V. stoveri* appears to show separation along the anterior margin of the cingulum; this indicates that the species may have an epicystal archeopyle rather than a 3I3P archeopyle.

***VECTIDINIUM* (cont'd)**

**stoveri* Liengjarern *et al.*, 1980, p.490-491, pl.54, fig.7. Late Eocene-Early Oligocene. We herein reject the transfer of this species to *Phthanoperidinium* by Islam, 1982, p.313.

VOTADINIUM Reid, 1977, p.444. Harland, 1982a, p.396 designated *Votadinium* as a section of the extant subgenus *Protoperidinium* (Berg) Balech, 1974.

**calvum* Reid, 1977, p.444-445, pl.2, fig.21-23. Recent. Harland, 1981, p.68 considered this species to represent the encysted stage of *Protoperidinium oblongum* (Aurivillius) Parke and Dodge.

spinosum Reid, 1977, p.445-446, pl.2, fig.24-26. Recent. Harland, 1981, p.68 considered this species to represent the encysted stage of *Protoperidinium claudicans* (Paulsen) Balech, 1974.

VOZZHENNIKOVIA Lentin and Williams, 1976, p.65-66. Lentin and Williams, 1981, p.287 rejected the conclusions of Morgan, 1977, p.131 that *Vozzhennikovia* is a *jr syn.* of *Dioxya* Cookson and Eisenack; the two species of the latter genus are morphologically distinctive Albian taxa.

**apertura* (Wilson, 1967a, p.64-65, fig.3-5,8) Lentin and Williams, 1976, p.65. Paleocene-Oligocene; formerly *Spinidinium*. The transfer of this species to *Dioxya* by Morgan, 1977, p.131 was rejected by Lentin and Williams, 1981, p.287.

"echinoidea" (Cookson and Eisenack, 1960a) Stover and Evitt, 1978, p.130. NOW and formerly *Spinidinium*. Originally *Deflandrea*.

"?elegantula" (Williams, 1978). NOW *Selenopemphix*. Williams, *op.cit.*, p.797 questionably included this species in *Vozzhennikovia*.

"?extensa" (Stover, 1973) Lentin and Williams, 1976, p.67. NOW *Lentinia;* formerly *Deflandrea*. Lentin and Williams, 1976, p.67 questionably included this species in *Vozzhennikovia* since it possesses a broad hexa 2a archeopyle. Stover, 1973, p.178 stated that the processes are fairly evenly spaced. He later observed (p.179) that the paratabulation is commonly obscure, although the outlines of some precingular and postcingular paraplates can be identified by the alignment of the processes, particularly on the dorsal surface of the epicyst. This is confirmed by the accompanying illustrations (pl.5, fig.4a and 5a). Although *?Vozzhennikovia extensa* therefore appeared to represent a distinct morphotype, Lentin and Williams, 1976, p.67 preferred to questionably include it in *Vozzhennikovia*. The transfer of this species to *Dioxya* by Morgan, 1977, p.131 was rejected by Lentin and Williams, 1981, p.287.

VOZZHENNIKOVIA (cont'd)

"?filigrana" (Benedek, 1972) Lentin and Williams, 1976, p.67. NOW *Phthanoperidinium;* formerly *Deflandrea.* This species, because of its broad hexa 2a archeopyle, was questionably included in *Vozzhennikovia* by Lentin and Williams, 1976. The transfer of the species to *Dioxya* by Morgan, 1977, p.131 was rejected by Lentin and Williams, 1981, p.287.

rotunda (Wilson, 1967a, p.65-66, fig.6-7) Lentin and Williams, 1976, p.67. Eocene; formerly *Spinidinium.* The transfer of this species to *Dioxya* by Morgan, 1977, p.131 was rejected by Lentin and Williams, 1981, p.287.

spinulosa Wilson, 1984c, p.549,552, fig.2-5. Maastrichtian.

"tenella" (Morgenroth, 1966b) Lentin and Williams, 1976, p.67. NOW *Lejeunecysta;* formerly *Lejeunia.* The transfer of this species to *Dioxya* by Morgan, 1977, p.131 was rejected by Lentin and Williams, 1981, p.287.

"tenera" (Krutzsch, 1962) Lentin and Williams, 1976, p.67. NOW *Geiselodinium;* formerly *?Deflandrea.* The transfer of this species to *Dioxya* by Morgan, 1977, p.131 was rejected by Lentin and Williams, 1981, p.287.

"villosa" (Eisenack and Cookson, 1960) Stover and Evitt, 1978, p.130. NOW *Dioxya.* The transfer of this species from *Dioxya* to *Vozzhennikovia* by Stover and Evitt, 1978 and by Burger, 1980a, p.85 was rejected by Lentin and Williams, 1981, p.287.

W

WALLODINIUM Loeblich and Loeblich, 1968, p.212. *nom. subst. pro Diplotesta* Cookson and Eisenack, 1960, *non* Brongniart, 1874. Duxbury, 1983, p.68 considered this genus to be an acritarch.

anglicum (Cookson and Hughes, 1964, p.56-57, pl.11, fig.1-5) Lentin and Williams, 1973, p.140. Late Albian-Early Cenomanian; formerly *Diplotesta.*

bidigitatum (Manum and Cookson, 1964, p.25-26, pl.5, fig.4-6) Lentin and Williams, 1973, p.140. Late Cretaceous; formerly *Diplotesta.*

cylindricum (Habib, 1970, p.374, pl.10, fig.2) Duxbury, 1983, p.68. Albian-Cenomanian. Originally *Prismatocystis.* See *Hexagonifera.* See also *Wallodinium elongatum* which is a *jr syn.* of this species.

"elongatum" (Beju, 1971, p.289-290, pl.3, fig.7-10; text-fig.6A-E) Duxbury, 1980, p.136. Bajocian-Oxfordian; formerly *?Fromea.* See also *Palaeostomocystis.* Duxbury, 1983, p.68 considered this to be a *jr syn.* of *Wallodinium cylindricum.*

**glaessneri* (Cookson and Eisenack, 1960b, p.256, pl.39, fig.4-6) Loeblich and Loeblich, 1968, p.212. Oxfordian-?Aptian; formerly *Diplotesta.*

inflatum (Habib, 1969, p.98, pl.3, fig.14-15; pl.4, fig.2) Habib, 1970, p.274. Albian-Cenomanian; formerly *Diplotesta.*

krutzschii (Alberti, 1961, p.21, pl.7, fig.19-21; pl.12, fig.6-7) Habib, 1972, p.378. Hauterivian-Barremian; formerly *Diplotesta.* O.C.

luna (Cookson and Eisenack, 1960a, p.10-11, pl.3, fig.21) Lentin and Williams, 1973, p.140. ?Late Albian-Cenomanian; formerly *Diplotesta.* N.I.A.

WANAEA Cookson and Eisenack, 1958, p.57; emend. Fensome, 1981, p.51.

"acollaris" (Dodekova, 1975). NOW *Energlynia.*

clathrata Cookson and Eisenack, 1958, p.58, pl.9, fig.6-8. Late Jurassic.

digitata Cookson and Eisenack, 1958, p.58, pl.9, fig.2-5. Late Jurassic; emend. Woollam, 1982, p.48.

WANAEA (cont'd)

fimbriata Sarjeant, 1961a, p.112-113, pl.15, fig.14; text-fig.13. Early Oxfordian.

"indotata" (Drugg, 1978). NOW *Energlynia.*

**spectabilis* (Deflandre and Cookson, 1955, p.293, pl.3, fig.12-14) Cookson and Eisenack, 1958, p.57. Oxfordian; formerly *Epicephalopyxis.*

thysanota Woollam, 1982, p.48, pl.2, fig.1; text-fig.1Bii. Late Callovian.

"zoharensis" Conway, 1978, p.347, pl.1, fig.6-7,9. Late Bathonian. *Jr syn.* of *Energlynia acollaris* according to Fensome, 1981, p.50.

WETZELIELLA Eisenack, 1938, p.187; emend. Williams and Downie, 1966b, p.182; emend. Lentin and Williams, 1976, p.129-130. The subgenus *Apectodinium* Costa and Downie, 1976 was raised to generic rank by Lentin and Williams, 1977b, p.8. See also *Rhombodinium.*

**articulata* Eisenack, 1938, p.186; text-fig.4. Late Eocene-Early Oligocene. See *Wetzeliella coronata, W. echinulata* and *W. horrida* which are *jr synonyms* of this species. See also *Wetzeliella hampdenensis.*

subsp. *"conopia"* (Williams and Downie, 1966b) Lentin and Williams, 1973, p.141. NOW *Kisselovia tenuivirgula* subsp. *conopia;* formerly *Wetzeliella articulata* var. *conopia.*

astra Costa *et al.,* 1978, p.263, text-fig.2. Early Eocene.

astroides Islam, 1983b, p.346,348, pl.3, fig.11. Early Eocene.

"augusta" (Harland, 1979c, as *Wetzeliella (Apectodinium)).* NOW *Apectodinium.*

"clathrata" (Eisenack, 1938). NOW *?Kisselovia.*

subsp. *"fasciata"* (Rozen, 1965). NOW *Kisselovia fasciata.*

"coleothrypta" (Williams and Downie, 1966b). NOW *Kisselovia.*

"condylos" (Williams and Downie, 1966b). NOW *Dracodinium.*

"coronata" (Vozzhennikova, 1967, p.170-171, pl.89, fig.1-3,5; pl.90, fig.1-5) Lentin and Williams, 1976, p.131. Late Eocene; formerly *Rhombodinium.* Costa and Downie, 1979, p.43 considered this species to be a *jr syn.* of *Wetzeliella articulata* Eisenack.

crispa Agelopoulos, 1967, p.21-22, pl.3, fig.8; pl.4, fig.5a-b. Late Eocene.

WETZELIELLA (cont'd)

"draco" (Alberti, 1961, as *Wetzeliella (Rhombodinium)).* NOW and formerly *Rhombodinium.*

"echinosuturata" (Wilson, 1967c). NOW *Wilsonidium.*

"echinulata" Vozzhennikova, 1967, p.164-165. Figured in Vozzhennikova, 1960, pl.3, fig.3; description not published until 1967. Eocene. Costa and Downie, 1979, p.40 considered this species to be a *jr syn.* of *Wetzeliella articulata* Eisenack.

"edwardsii" (Wilson, 1967c). NOW *Kisselovia.*

eocaenica Agelopoulos, 1967, p.16-17, pl.2, fig.6-7; pl.3, fig.1-7. Early-Late Eocene. The contention by Stover and Evitt, 1978, p.132 that this species is invalidly published was rejected by Lentin and Williams, 1981, p.289.

"glabra" (Cookson, 1956). NOW *Rhombodinium.*

var. *"granulata"* (Wilson, 1967c, as *Wetzeliella (Rhombodinium) glabra* var. *granulata).* NOW *Dracodinium granulatum.*

gochtii Costa and Downie, 1976, p.609-610, pl.92, fig.2-3. Middle Oligocene. O.C.

hampdenensis Wilson, 1967c, p.480-481, fig.17,19. Middle Eocene. Lentin and Williams, 1981, p.290 rejected the contention of Costa and Downie, 1979, p.40 that this species is a *jr syn.* of *Wetzeliella articulata* Eisenack.

"homomorpha" (Deflandre and Cookson, 1955). NOW *Apectodinium.*

subsp. *"quinquelata"* (Williams and Downie, 1966b) Lentin and Williams, 1973, p.141. NOW *Apectodinium quinquelatum;* formerly *Wetzeliella homomorpha* var. *quinquelata.* See also *Apectodinium homomorphum* subsp. *quinquelatum.*

"horrida" Jan du Chêne and Châteauneuf, 1975, p.28,30, pl.1, fig.1-7; pl.3, fig. 1-6. Early Eocene (Cuisian). *Jr syn.* of *Wetzeliella articulata* according to Stover and Evitt, 1978, p.131.

"hyperacantha" (Cookson and Eisenack, 1965b). NOW *Apectodinium.*

"intermedia" (Cookson and Eisenack, 1961b). NOW *Wilsonidium.*

"irregularis" (Cookson and Eisenack, 1958). NOW *Tubotuberella.* See also *Scriniodinium.* Lentin and Williams, 1981, p.290 did not agree with Costa and Downie, 1979, p.43 that this species is synonymous with *Wetzeliella meckelfeldensis.*

WETZELIELLA **(cont'd)**

irtyschensis Alberti, 1961, p.8, pl.1, fig.11-12; pl.12, fig.8. Early Oligocene.

"lineidentata" (Deflandre and Cookson, 1955). NOW *Wilsonidium.*

"longispinosa" (Wilson, 1968) Lentin and Williams, 1976, p.132. NOW *Apectodinium;* formerly *Deflandrea.*

lunaris Gocht, 1969, p.13-15, pl.10, fig.1-3; text-fig.6. Early Eocene.

meckelfeldensis Gocht, 1969, p.15-16, pl.10, fig.12-15. Early Eocene.

subsp. *lobisca* (Williams and Downie, 1966b, p.196, pl.20, fig.3) Costa and Downie, 1979, p.43. Early Eocene. Originally *Wetzeliella symmetrica* var. *lobisca;* subsequently *Wetzeliella symmetrica* subsp. *lobisca*

"minuscula" (Alberti, 1961, as *Wetzeliella (?Rhombodinium) minuscula).* NOW *Palaeotetradinium.*

"?neocomica" (Gocht, 1957). NOW *Phoberocysta.* Gocht, 1957, p.172 questionably included this species in *Wetzeliella.*

forma *"circulata"* (Gocht, 1957). NOW *Phoberocysta neocomica* subsp. *circulata.*

forma *"convexa"* (Gocht, 1957). NOW *Phoberocysta neocomica* subsp. *convexa.*

forma *"cruciformis"* (Gocht, 1957). NOW *Phoberocysta neocomica* subsp. *cruciformis.*

forma *"dedecosa"* (Gocht, 1957). NOW *Phoberocysta neocomica* subsp. *dedecosa.*

forma *"pteridia"* (Gocht, 1957). NOW *Phoberocysta neocomica* subsp. *pteridia.*

forma *"subovalis"* (Gocht, 1957). NOW *Phoberocysta neocomica* subsp. *subovalis.*

"ornata" (Wilson, 1967c). NOW *Wilsonidium.* The transfer of this species to *?Rhombodinium* by Stover and Evitt, 1978, p.121 was rejected by Lentin and Williams, 1981, p.244.

ovalis Eisenack, 1954, p.59, pl.8, fig.17. Early Oligocene.

"pachyderma" (Caro, 1973). NOW *Dracodinium.*

WETZELIELLA (cont'd)

"paniculata" (Costa and Downie, 1976). NOW *Apectodinium.*

"parva" (Alberti, 1961). NOW *Apectodinium.*

"pentagona" (Vozzhennikova, 1967) Lentin and Williams, 1976, p.132. NOW and formerly *Rhombodinium.* In view of the nature of the archeopyle and ornamentation, Lentin and Williams, 1981, p.291 did not agree with Costa and Downie, 1979, p.40 that this taxon is a *jr syn.* of *Wetzeliella articulata* Eisenack.

"perforata" (Jan du Chêne and Chateauneuf, 1975 as *Wetzeliella (Rhombodinium) perforata).* NOW *Rhombodinium.*

"?pilata" (Stanley, 1965). NOW *?Spinidinium.* Lentin and Williams, 1976, p.132 questionably included this species in *Wetzeliella.*

"reticulata" (Williams and Downie, 1966b). NOW *Kisselovia.*

"rhomboidea" (Alberti, 1961, as *Wetzeliella (Rhombodinium) rhomboidea).* NOW *Dracodinium.*

"?rugosa" (Stanley, 1965). NOW *?Wilsonidium.* The retention of this species in *?Wetzeliella* by Stover and Evitt, 1978, p.132 was rejected by Lentin and Williams, 1981, p.291.

"samlandica" (Eisenack, 1954). NOW *Dracodinium.*

"similis" (Eisenack, 1954). NOW *Dracodinium.*

"solida" (Gocht, 1955) Williams and Downie, 1966b, p.195. NOW and formerly *Dracodinium.*

"sumissa" (Harland, 1979c, as *Wetzeliella (Apectodinium)).* NOW *Apectodinium.*

symmetrica Weiler, 1956, p.132-135, pl.11, fig.1-3; text-fig.2-5. Middle Oligocene.

subsp. *incisa* Gerlach, 1961, p.156-158, pl.25, fig.9. Middle-Late Oligocene. See also *Hystrichosphaeridium saturnium* which is a *jr syn.* of this species.

subsp. *"lobisca"* (Williams and Downie, 1966b) Lentin and Williams, 1973, p.143. NOW *Wetzeliella meckelfeldensis* subsp. *lobisca;* formerly *Wetzeliella symmetrica* var. *lobisca.*

subsp. *symmetrica* Weiler, 1956, p.132-135, pl.11, fig.1-3; text-fig.2-5. Middle Oligocene.

WETZELIELLA (cont'd)

"tabulata" (Wilson, 1967c). NOW *Wilsonidium*.

"tenuivirgula" (Williams and Downie, 1966b). NOW *Kisselovia*.

subsp. *"crassiramosa"* (Williams and Downie, 1966b) Lentin and Williams, 1973, p.143. NOW *Kisselovia crassiramosa;* formerly *Wetzeliella tenuivirgula* var. *crassiramosa*.

unicaudalis Caro, 1973, p.366,368, pl.5, fig.1,9. Early Eocene.

"varielongituda" (Williams and Downie, 1966b). NOW *Dracodinium*.

"waipawaensis" (Wilson, 1967c, as *Wetzeliella (Rhombodinium) waipawaensis)*. NOW *Dracodinium*.

wetzelii Agelopoulos, 1967, p.17-18, pl.2, fig.4-5b. Late Eocene. O.C. The contention by Stover and Evitt, 1978, p.132 that this species is invalidly published was rejected by Lentin and Williams, 1981, p.292.

WETZELODINIUM Deflandre, 1936b, p.168.

**tentaculatum* (O. Wetzel, 1933a, p.171, pl.2, fig.23; text-fig.4) Deflandre, 1936b, p.168-169. ?Senonian; formerly *Polykrikos*.

WILLIAMSIDINIUM Lentin, 1983, p.148,150.

**banksianum* Lentin, 1983, p.150, pl.1, fig.1-7; text-fig.1. Maastrichtian.

WILSONIDIUM Lentin and Williams, 1976, p.138-139.

"?aechmophorum" (Benedek, 1972) Lentin and Williams, 1976, p.139. NOW *Gerlachidium;* formerly *Lejeunia*. At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Wilsonidium*.

echinosuturatum (Wilson, 1967c, p.477-479, fig.3,22-25) Lentin and Williams, 1976, p.139. Middle Eocene; formerly *Wetzeliella*.

"glabrum" (Cookson, 1956) Costa and Downie, 1979, p.45. This transfer was rejected by Lentin and Williams, 1981, p.243, who retained the species in *Rhombodinium*.

intermedium (Cookson and Eisenack, 1961b, p.40, pl.1, fig.5-6) Costa and Downie, 1979, p.45. Eocene. Originally *Wetzeliella;* subsequently *Rhombodinium*.

lineidentatum (Deflandre and Cookson, 1955, p.253-254, pl.5, fig.5; text-fig. 17-18) Lentin and Williams, 1976, p.139. Eocene; formerly *Wetzeliella*.

***WILSONIDIUM* (cont'd)**

ornatum (Wilson, 1967c, p.481-482, fig.33-34) Lentin and Williams, 1976, p.139. Early Eocene; formerly *Wetzeliella*. The transfer of this species to *?Rhombodinium* by Stover and Evitt, 1978, p.121 was rejected by Lentin and Williams, 1981, p.244.

?rugosum (Stanley, 1965, p.222-223, pl.21, fig.6-11) Lentin and Williams, 1976, p.140. Paleocene; formerly *Wetzeliella*. At the time of the transfer, Lentin and Williams, *op.cit.* questionably included this species in *Wilsonidium*. The retention of this species in *?Wetzeliella* by Stover and Evitt, 1978, p.132 was rejected by Lentin and Williams, 1981, p.291. The transfer of this species to *Spinidinium* by Costa and Downie, 1979, p.45 was rejected by Lentin and Williams, 1981, p.292.

**tabulatum* (Wilson, 1967c, p.473-474, fig.2,4-7,10-11) Lentin and Williams, 1976, p.138. Late Eocene; formerly *Wetzeliella*.

tesselatum (Châteauneuf and Gruas-Cavagnetto, 1978, p.65-66, pl.1, fig.1-2) Islam, 1983c, p.90. Early Eocene (Sparnacian); formerly *Apectodinium homomorphum* subsp. *tesselatum*. This taxon was raised to the species level by Islam, 1983c, p.90.

XYZ

XANDARODINIUM Reid, 1977, p.446-447.

variabile Bujak, 1984, p.194-195, pl.4, fig.7-10; text-fig.3. Late Miocene-Early Pleistocene.

**xanthum* Reid, 1977, p.447-448, pl.3, fig.27-29. Recent. Matsuoka, 1984b, p.2 and Lewis *et al.*, 1984, p.30 considered this species to represent the encysted stage of *Protoperidinium divaricatum* (Meunier) Parke and Dodge.

XENASCUS Cookson and Eisenack, 1969, p.7; emend. Yun, 1981, p.60. Davey and Verdier, 1971, p.27 listed the type of this genus, *X. australensis*, as a *jr syn.* of *Phoberocysta ceratioides* (Deflandre, 1937b) Davey and Verdier, 1971, p.26. Lentin and Williams, 1973, p.143 concurred with this interpretation. However, they retained *Xenascus* (type species: *X. ceratioides* = *sr syn.* of *X. australensis*, = *Phoberocysta ceratioides*, = *Hystrichosphaera ceratioides)* as a genus separate from *Phoberocysta* (type species: *P. neocomica* = *Wetzeliella neocomica)* on the grounds that they are morphologically distinct. *Xenascus* is characterized, by a single, lateral (postcingular) horn, whereas *Phoberocysta* is characterized by two, similar, lateral (postcingular) horns.

australensis Cookson and Eisenack, 1969, p.7, fig.1,I-K. Albian-Cenomanian. Davey and Verdier, 1971, p.26 considered this species to be a *jr syn.* of *Xenascus ceratioides* (Deflandre) Lentin and Williams. We herein consider *X. australensis* as a distinct and separate species.

**ceratioides* (Deflandre, 1937b, p.66-67, pl.12, fig.7-8) Lentin and Williams, 1973, p.144. Senonian. Originally *Hystrichosphaera;* subsequently *Phoberocysta,* then *Pseudoceratium.* See also *Endoceratium perforatum* and *Odontochitina blastema* which are *jr synonyms* of this species.

subsp. *procerus* Yun, 1981, p.61, pl.14, fig.5,8-9. Early Santonian.

esbeckianus Yun, 1981, p.61-62, pl.14, fig.2-4,6. Early Santonian.

gochtii (Corradini, 1973, p.179-181, pl.29, fig.1a-b,3: text-fig.9) Stover and Evitt, 1978, p.88. Senonian; formerly *Phoberocysta.*

XENASCUS **(cont'd)**

perforatus (Vozzhennikova, 1967, p.188, pl.112, fig.1a-b,3; pl.113, fig.1) Yun, 1981, p.62. Late Cretaceous; formerly *Endoceratium*. Davey and Verdier, 1971, p.27 considered this species to be a *jr syn.* of *Pseudoceratium ceratioides*. Yun, 1981, p.62, however, emended the diagnosis and retained it as a separate species.

plotei Below, 1981a, p.21-22, pl.2, fig.8-9; pl.8, fig.20-21; pl.14, fig.15; text-fig.10. Aptian-Cenomanian.

sarjeantii (Corradini, 1973, p.181, pl.29, fig.2a-b, 4a-b; pl.37, fig.3) Stover and Evitt, 1978, p.88. Senonian; formerly *Phoberocysta*.

serpaglii (Corradini, 1973, p.181-182, pl.29, fig.5,7a-b; pl.37, fig.4) Stover and Evitt, 1978, p.88. Senonian; formerly *Phoberocysta*.

XENICODINIUM Klement, 1960, p.53-54.

**densispinosum* Klement, 1960, p.54, pl.5, fig.14-15. Early Kimmeridgian.

"*hispidum*" (Drugg, 1970a). NOW *Sumatradinium*.

lubricum Morgenroth, 1968, p.554, pl.47, fig.9; pl.48, fig.1. Danian.

reticulatum Hansen, 1977, p.12, fig.20D-G. Danian.

rugulatum Hansen, 1977, p.12-13, fig.20H-J. Danian.

XENIKOON Cookson and Eisenack, 1960a, p.14-16.

"*americanus*" (Habib, 1970). NOW *Craspedodinium*.

**australis* Cookson and Eisenack, 1960a, p.16, pl.3, fig.16-17. Turonian-Campanian.

XIPHOPHORIDIUM Sarjeant, 1966b, p.146-147. Lentin and Williams, 1981, p.294 rejected the contention of Below, 1981a, p.64 that this genus is a *jr syn.* of "*Oodnadattia*" Eisenack and Cookson. See also *Pyramidium* which is a *jr syn.* of this genus.

**alatum* (Cookson and Eisenack, 1962b, p.487, pl.2, fig.1-4) Sarjeant, 1966b, p.147-148. Albian-Cenomanian; formerly *Hystrichodinium*. See also *Pyramidium*. Lentin and Williams, 1981, p.294 rejected the transfer of this species to the genus *Oodnadattia* Eisenack and Cookson by Below, 1981a, p.107.

asteriforme Yun, 1981, p.57-58, pl.8, fig.7,9-10. Early Santonian.

XYLOCHOARION Erkmen and Sarjeant, 1978, p.401,403-404.

**hacknessense* Erkmen and Sarjeant, 1978, p.404,406, text-fig.1-11. Callovian.

YALKALPODINIUM Morgan, 1980, p.34

areolatum (Cookson and Eisenack, 1960b, p.253, pl.38, fig.7-8) Morgan, 1980, p.34. Tithonian; formerly *Cyclonephelium*.

indicum (Jain and Taugourdeau-Lantz, 1973, p.64, pl.4, fig.1-2) Morgan, 1980, p.34. Early Cretaceous; formerly *?Ovoidinium*.

**scutum* Morgan, 1980, p.34, pl.31, fig.15-18. Late Neocomian-Late Albian.

INDEX OF CALCAREOUS DINOFLAGELLATES

ALASPHAERA Keupp, 1979b, p.285-287,289.

**caudata* Keupp, 1979b, p.285-287,289, text-fig.1-7. Hauterivian.

tuberculata (Pflaumann and Krasheninnikov, 1978, p.820-821, pl.1, fig.7-8) Keupp, 1981, p.55. Late Valanginian-Early Hauterivian; formerly *Pithonella*. See also *Alasphaera verrucosa* which is a *jr syn*. of this species.

"*verrucosa*" Keupp, 1979c, p.656,658, pl.6, fig.1-5. Early Hauterivian. *Jr. syn*. of *Alasphaera tuberculata* according to Keupp, 1981, p.55.

BICARINELLUM Deflandre, 1948, p.212. See also *Biechelerella* and *Calcisphaerellum* which are *synonyms* of this genus.

calvum Keupp, 1979a, p.38-39, pl.10, fig.1-10. Early Barremian.

**castaninum* Deflandre, 1948, p.212, fig.28-31,34. Middle Eocene.

cristatum Keupp, 1982, p.335-337, pl.6.2-9, fig.7-12. Late Aptian-Early Albian. This species was first referred to in Keupp, 1981, p.49.

jurassicum (Deflandre, 1948, p.210-211, fig.26-27) Keupp, 1984, p.20. Late Jurassic; formerly *Biechelerella*. See also *Calcisphaerellum flosculus* which is a *jr syn*. of this species.

"BIECHELERELLA" Deflandre, 1948, p.209-210. Keupp, 1984, p.20 considered this genus to be a synonym of *Bicarinellum*. Accordingly, he transferred the type and only species of *Biechelerella*, *B. jurassica*, to *Bicarinellum*.

BONETOCARDIELLA Dufour, 1968, p.1948; emend. Villain, 1975, p.196; emend. Masters and Scott, 1978, p.215. The majority of the species in this genus are not calcareous dinoflagellates; however, the two listed below may be.

"*paulaworstellae*" (Bolli, 1978b). NOW *Heptasphaera*.

"*williambensonii*" (Bolli, 1978b). NOW *Obliquipithonella*.

CALCICARPINUM Deflandre, 1948, p.216; emend. Keupp, 1984, p.22.

"*mutterlosei*" (Keupp, 1979a). NOW *Calcigonellum*.

**tetraedricum* Deflandre, 1948, p.216,218; text-fig.35-37. Eocene.

CALCIGONELLUM Deflandre, 1948, p.206; emend. Keupp, 1984, p.14. See also *Calciogranellum* which is a *syn*. of this genus.

dolium Keupp, 1979a, p.39-40, pl.9, fig.7-9. Early Barremian.

CALCIGONELLUM **(cont'd)**

**infula* Deflandre, 1948, p.206, fig.13-18; emend. Keupp, 1984, p.14-15. Late Miocene.

limbatum (Deflandre, 1948, p.204, fig.10-12) Keupp, 1984, p.15. Late Miocene; formerly *Calciogranellum*.

mutterlosei (Keupp, 1979a, p.41, pl.10, fig.11-12; pl.11, fig.1-5) Keupp, 1980a, p.127. Early Barremian; formerly *Calcicarpinum*.

polymorphum Keupp, 1980a, p.128, p.130-131, pl.15, fig.7-15; pl.16, fig.1-6. Late Aptian-Early Albian.

subsp. *dentatum* Keupp, 1980a, p.131, pl.15, fig.13-15; pl.16, fig.1. Late Gargasian.

subsp. *tenue* Keupp, 1980a, p.131-132, pl.16, fig.2-6. Late Clansayesian.

sulcatum Keupp, 1979c, p.658, pl.6, fig.16-21. Early Hauterivian.

CALCIODINELLUM Deflandre, 1947b, p.1781-1782.

**operosum* Deflandre, 1947b, p.1781-1782, fig.1-6. Late Miocene. See also *Thoracosphaera edwardsii* which is a *jr syn.* of this species.

"CALCIOGRANELLUM" Deflandre, 1948, p.204. Keupp, 1984, p.15-16 considered this genus to be a synonym of *Calcigonellum* and transferred the type and only species of *Calciogranellum, C. limbatum,* to *Calcigonellum*.

CALCIPTERELLUM Deflandre, 1948, p.207; emend. Keupp, 1984, p.17.

**colomii* Deflandre, 1948, p.208, fig.19-21; emend. Keupp, 1984, p.17-18. Late Miocene.

"CALCISPHAERELLUM" Deflandre, 1948, p.215. Keupp, 1984, p.20 considered the type and only species of this genus *C. flosculus,* to be a *jr syn.* of *Bicarinellum jurassicum*. Thus *Calcisphaerellum* is a *syn.* of *Bicarinellum*.

*"*flosculus"* Deflandre, 1948, p.215-216, fig.32-33. Oxfordian. Keupp, 1984, p.20 considered this species to be a *jr syn.* of *Bicarinellum jurassicum*.

CARINELLUM Keupp, 1981, p.50-51.

conulum Keupp, 1981, p.52-53, pl.42, fig.1-6. Early Barremian.

**monocarinatum* Keupp, 1981, p.51-52, pl.40, fig.4-15; pl.41, fig.1-12. Late Hauterivian.

CARINELLUM (cont'd)

parasolis Keupp, 1984, p.22, pl.10, fig.9-12. Eocene.

CHONESPHAERA Klumpp, 1953, p.395.

**incerta* Klumpp, 1953, p.395, pl.19, fig.9. Late Eocene. This microfossil was originally described as a dinoflagellate cyst. The type material is lost, however, and Keupp (pers. comm., March, 1985) believes that the taxon is not related to the dinoflagellates.

DIMORPHOSPHAERA Keupp, 1979a, p.21.

**aequatoriana* Keupp, 1979a, p.21,23, pl.3, fig.1-3. Early Barremian. See also *Dimorphosphaera pogonias* which is a *jr syn.* of this species.

"pogonias" Keupp, 1979c, p.658,660, pl.6, fig.13-15. Middle Barremian. *Jr syn.* of *Dimorphosphaera aequatoriana* according to Keupp, 1981, p.26.

ECHINODINELLA Keupp, 1980a, p.132-133.

**erinacea* Keupp, 1980a, p.133-134, pl.16, fig.7-15; pl.17, fig.1-9. Late Aptian.

levata Keupp, 1981, p.18-19, pl.8, fig.1-11. Late Hauterivian-Late Aptian.

triangularis Keupp, 1980a, p.134-135, pl.17, fig.10-15. Late Gargasian.

HEPTASPHAERA Keupp, 1979a, p.41-42.

**michaeli* Keupp, 1979a, p.42-43, pl.11, fig.6-12. Early Barremian.

paulaworstellae (Bolli, 1978) *comb. nov.*
1978 *Bonetocardiella paulaworstellae* Bolli, p.912, pl.1, fig.1-12. Oxfordian-Kimmeridgian. Keupp, 1981, p.57 suggested this combination but failed to effect it according to the requirements of the I.C.B.N.

NEPHRODINELLA Keupp, 1981, p.66.

**reniformis* Keupp, 1981, p.66-68, pl.53, fig.1-11. Late Hauterivian-Middle Barremian.

OBLIQUIPITHONELLA Keupp *in* Keupp and Mutterlose, 1984, p.158. When Keupp erected this genus he failed to transfer the type species, *O. multistrata,* from *Pithonella.* The transfer of that species and others indicated by Keupp, *op.cit.* as belonging to the genus are made herein. Keupp (pers. comm., March 1985), supplied a list of those species which should also be included in *Obliquipithonella,* thus removing from *Pithonella* all species with dinoflagellate affinities.

***OBLIQUIPITHONELLA* (cont'd)**

amplicrystallina (Pflaumann and Krasheninnikov, 1978) *comb. nov.*
1978 *Pithonella amplicrystallina* Pflaumann and Krasheninnikov, p.820, pl.3, fig.4-7. Maastrichtian.

bassriverensis (Olssen and Youssefnia, 1979) *comb. nov.*
1979 *Pithonella bassriverensis* Olssen and Youssefnia, p.1090, pl.1, fig.13-16. Cenomanian.

bilamellata (Pflaumann and Krasheninnikov, 1978) *comb. nov.*
1978 *Pithonella bilamellata* Pflaumann and Krasheninnikov, p.822, pl.5, fig.5-6; pl.6, fig.1-2. Campanian-Early Maastrichtian.

carteri (Bolli, 1974) *comb. nov.*
1974 *Pithonella carteri* Bolli, p.852, pl.1, fig.1-4; pl.8, fig.1-3; pl.21, fig.1. Tithonian.

cookii (Bolli, 1974) *comb. nov.*
1974 *Pithonella cookii* Bolli, p.856, pl.6, fig.9-12; pl.18, fig.3-9; pl.23, fig.6. Coniacian-Santonian.

cylindrica (Pflaumann and Krasheninnikov, 1978) *comb. nov.*
1978 *Pithonella cylindrica* Pflaumann and Krasheninnikov, p.822, pl.5, fig.1-4. Campanian-Maastrichtian.

echinosa (Keupp, 1982) *comb. nov.*
1982 *Pithonella echinosa* Keupp, p.331-332, pl.7, fig.10-12; pl.8, fig.1-2. Early Albian.

edgarii (Bolli, 1974) *comb. nov.*
1974 *Pithonella edgarii* Bolli, p.854, pl.4, fig.1-4; pl.13, fig.3-7; pl.22, fig.4. Albian. See also *Pithonella titanoplax* which is a *jr syn.* of this species.

fusiformis (Rögl, 1976) *comb. nov.*
1976 *Pithonella fusiformis* Rögl, p.702, pl.1, fig.12-14; pl.2, fig.9-12.

guttula (Pflaumann and Krasheninnikov, 1978) *comb. nov.*
1978 *Pithonella guttula* Pflaumann and Krasheninnikov, p.821-822, pl.8, fig.1-4. Valanginian-Hauterivian.

heirtzleri (Bolli, 1974) *comb. nov.*
1974 *Pithonella heirtzleri* Bolli, p.855, pl.5, fig.5-8; pl.15, fig.7-12; pl.16, fig.1-4; pl.23, fig.2. Albian.

johnstonei (Bolli, 1974) *comb. nov.*
1974 *Pithonella johnstonei* Bolli, p.856, pl.6, fig.5-8; pl.18, fig.1-2; pl.23, fig.5. Coniacian-Santonian.

OBLIQUIPITHONELLA **(cont'd)**

krasheninnikovii (Bolli, 1974) *comb. nov.*
1974 *Pithonella krasheninnikovii* Bolli, p.856, pl.7, fig.1-5; pl.18, fig.10-12; pl.19, fig.1-12; pl.20, fig.1-4; pl.24, fig.1-2. Coniacian-Santonian.

lepidota (Keupp, 1982) *comb. nov.*
1982 *Pithonella lepidota* Keupp, p.330-331, pl.7, fig.2-7. Late Aptian-Early Albian.

loeblichii (Bolli, 1974) *comb. nov.*
1974 *Pithonella loeblichii* Bolli, p.853-854; pl.3, fig.1-4; pl.11, fig.9-12; pl.12, fig.1-3; pl.22, fig.1. ?Late Aptian-Middle Albian. Keupp, 1979a, p.23 considered this species to be a *jr syn.* of *Pithonella helentappanae.* However, Keupp, 1981 regarded *Pithonella loeblichii* and *Pithonella helentappanae* as distinct and separate species. See also *Pithonella bollii, P. megalithica* and *P. nonarenziae* which are *jr synonyms* of this species.

longiporosa (Pflaumann and Krasheninnikov, 1978) *comb. nov.*
1978 *Pithonella longiporosa* Pflaumann and Krasheninnikov, p.280, pl.2, fig.1-2; pl.3, fig.3. Latest Albian-Cenomanian.

loricata (Krasheninnikov and Basov, 1983) *comb. nov.*
1983 *Pithonella loricata* Krasheninnikov and Basov, p.982, pl.3, fig.1-7. Albian.

mcnightii (Bolli, 1974) *comb. nov.*
1974 *Pithonella mcnightii* Bolli, p.852-853, pl.1, fig.5-8; pl.8, fig.4-8; pl.2, fig.2. Tithonian.

miniaperta (Krasheninnikov and Basov, 1983) *comb. nov.*
1983 *Pithonella miniaperta* Krasheninnikov and Basov, p.983, pl.5, fig.1-8. Albian.

**multistrata* (Pflaumann and Krasheninnikov, 1978) *comb. nov.*
1978 *Pithonella multistrata* Pflaumann and Krasheninnikov, p.841, pl.7, fig.3-6. Valanginian-Barremian. See also *Pithonella atlantica and P. excentrica* which are *jr synonyms* of this species.

parva (Fütterer, 1984) *comb. nov.*
1984 *Pithonella parva* Fütterer, p.536-537, pl.3, fig.1-10; pl.4, fig.8-9. Danian-Early Pleistocene.

patriciagreeleyae (Bolli, 1974) *comb. nov.*
1974 *Pithonella patriciagreeleyae* Bolli, p.853, pl.2, fig.9-12; pl.11, fig.1-8; pl.21, fig.5. Barremian-Albian. This species was described as a calcisphere by Bolli, 1974. Keupp, 1980c, p.515-522 illustrated and described the peridinioid plate structure of the species but did not emend the diagnosis. See also *Pithonella francadecimae* which is a *jr syn.* of this species.

OBLIQUIPITHONELLA* *patriciagreeleyae (cont'd)

subsp. *ovata* (Keupp, 1979a) *comb. nov.*
1979a *Pithonella patriciagreeleyae* subsp. *ovata* Keupp, p.32, pl.6, fig.10; pl.7, fig.1-3. Early Barremian. See also *Pithonella sliteri* which is a *jr syn.* of this subspecies.

piriformis (Keupp, 1977) *comb. nov.*
1977 *Pithonella piriformis* Keupp, p.66-67, pl.23, fig.1-5; text-fig.7. Tithonian.

porosa (Pflaumann and Krasheninnikov, 1978) *comb. nov.*
1978 *Pithonella porosa* Pflaumann and Krasheninnikov, p.820, pl.2, fig.4-7; pl.3, fig.1-3. Albian-Cenomanian.

forma *obturata* (Pflaumann and Krasheninnikov, 1978) *comb. nov.*
1978 *Pithonella porosa* forma *obturata* Pflaumann and Krasheninnikov, p.820, pl.3, fig.1-3. Latest Albian-Cenomanian.

quiltyi (Bolli, 1974) *comb. nov.*
1974 *Pithonella quiltyi* Bolli, p.855-856, pl.6, fig.1-4; pl. 17, fig.1-12; pl.23, fig.4. Albian.

robinsonii (Bolli, 1974) *comb. nov.*
1974 *Pithonella robinsonii* Bolli, p.854, pl.4, fig.5-8; pl.13, fig.8-12; pl.14, fig.1-3; pl.22, fig.5. Albian. See also *Pithonella trilamellata* which is a *jr syn.* of this species.

subsp. *coalita* (Keupp, 1979a) *comb. nov.*
1979a *Pithonella robinsonii* subsp. *coalita* Keupp, p.27, pl.4, fig.9-10. Early Barremian.

rockeri (Bolli, 1974) *comb. nov.*
1974 *Pithonella rockeri* Bolli, p.854, pl.3, fig.5-8; pl.12, fig.4-6; pl.22, fig.2. ?Late Aptian-Middle Albian.

sheilasantawae (Bolli, 1974) *comb. nov.*
1974 *Pithonella sheilasantawae* Bolli, p.854-855, pl.4, fig.9-12; pl.14, fig.4-9; pl.22, fig.6. Albian. See also *Thoracosphaera thoracata* which is a *jr syn.* of this species.

sliteri (Bolli, 1980) *comb. nov.*
1980 *Pirumella sliteri* Bolli, p.528, pl.5, fig.1-12; pl.6, fig.1-6. Late Hauterivian. Originally *Pirumella*, subsequently *Pithonella*.

spinosa (Keupp, 1979a) *comb. nov.*
1979a *Thoracosphaera spinosa* Keupp, p.17-18, pl.1. fig.6. Early Barremian. Originally *Thoracosphaera*, subsequently *Pithonella*.

***OBLIQUIPITHONELLA* (cont'd)**

squalida (Krasheninnikov and Basov, 1983) *comb. nov.*
1983 *Pithonella squalida* Krasheninnikov and Basov, p.982, pl.4, fig.1-8. Earliest Late Cenomanian.

squamosa (Krasheninnikov and Basov, 1983) *comb. nov.*
1983 *Pithonella squamosa* Krasheninnikov and Basov, p.983, pl.6, fig.1-6. Albian.

strobila (Keupp, 1979a) *comb. nov.*
1979a *Thoracosphaera strobila* Keupp, p.18, pl.2, fig.1-3. Early Barremian. Originally *Thoracosphaera,* subsequently *Pithonella.*

tanyphloia (Keupp, 1979a) *comb. nov.*
1979a *Pithonella tanyphloia* Keupp, p.29-30, pl.6, fig.1-8. Early Barremian. See also *Pithonella woodburyensis* which is a *jr syn.* of this species.

thayeri (Bolli, 1974) *comb. nov.*
1974 *Pithonella thayeri* Bolli, p.853, pl.1, fig.9-12; pl.8, fig.9-12; pl.9, fig.1-12; pl.21, fig.3. Oxfordian-Tithonian. See also *Pirumella edithvincentiae, Pithonella guttula, P. helentappanae* and *P. oviformis* which are *jr synonyms* of this species.

transitoria (Krasheninnikov and Basov, 1983) *comb. nov.*
1983 *Pithonella transitoria* Krasheninnikov and Basov, p.983, pl.7. fig.1-6. Campanian.

trilamellata (Pflaumann and Krasheninnikov, 1978) *comb. nov.*
1978 *Pithonella trilamellata* Pflaumann and Krasheninnikov, p.821, pl.6, fig.3-5,7; pl.7, fig.1-2. Valanginian-Barremian.

williambensonii (Bolli, 1978b) *comb. nov.*
1978b *Bonetocardiella williambensonii* Bolli, p.912-913, pl.2, fig.1-12; pl.3, fig.1-12. Oxfordian-Kimmeridgian. Originally *Bonetocardiella,* subsequently *Pithonella.*

ORTHOPITHONELLA Keupp *in* Keupp and Mutterlose, 1984, p.158. When Keupp erected *Orthopithonella,* he failed to transfer the type species, *Orthopithonella gustafsonii,* from *Pithonella.* The transfer of that species and the other species indicated by Keupp, *op.cit.* as belonging to *Orthopithonella* are made herein.

albatrosiana (Kamptner, 1963) *comb. nov.*
1963 *Thoracosphaera albatrosiana* Kamptner, p.177, fig.30. Modern. See also *Thoracosphaera rela* and *T. ricoseta* which are *jr synonyms* of this species.

ORTHOPITHONELLA **(cont'd)**

compsa (Keupp, 1982) *comb. nov.*
1982 *Pithonella compsa* Keupp, p.318-319, pl.3, fig.5-8. Late Aptian-Campanian.

globosa (Fütterer, 1984) *comb. nov.*
1984 *Pithonella globosa* Fütterer, p.536, pl.2, fig.1-9. Middle Maastrichtian-Early Danian.

**gustafsonii* (Bolli, 1974) *comb. nov.*
1974 *Pithonella gustafsonii* Bolli, p.854, pl.3, fig.9-12; pl.12, fig.7-12; pl.13, fig.1-2; pl.22, fig.3. ?Late Aptian-Middle Albian. See also *Pithonella paratabulata* which is a *jr syn.* of this species.

porata (Keupp, 1982) *comb. nov.*
1982 *Pithonella porata* Keupp, p.316-318, pl.2, fig.12; pl.3, fig.1-4,10. Early Barremian-Early Albian.

pycnotheca (Keupp, 1978) *comb. nov.*
1978 *Pithonella pycnotheca* Keupp, p.94, fig.11-12. Tithonian.

tithonica (Keupp, 1978) *comb. nov.*
1978 *Pithonella tithonica* Keupp, p.90,92, fig.7-10. Tithonian.

veeversii (Bolli, 1974) *comb. nov.*
1974 *Pithonella veeversii* Bolli, p.855, pl.5, fig.9-12; pl.16, fig.5-12; pl.23, fig.3. Albian.

"PIRUMELLA" Bolli, 1980, p.528. Keupp, 1981, p.44 considered the type of the genus, *Pirumella edithvincentiae,* to be a *jr syn.* of *Obliquipithonella* (as *Pithonella) thayeri,* thus making *Pirumella* a *jr syn.* of *Pithonella.*

"**edithvincentiae*" Bolli, 1980, p.528, pl.4, fig.1-12. Late Hauterivian. *Jr syn.* of *Obliquipithonella* (as *Pithonella) thayeri* according to Keupp, 1981, p.44.

"piriformis" Bolli, 1980, p.528 suggested that a species by this name should be included in *Pirumella.* However, he did not give a citation or propose a new combination.

"sliteri" (Bolli, 1980). NOW *Obliquipithonella.*

PITHONELLA Lorenz, 1901; emend. Bignot and Lezaud, 1964, p.140; emend. Villain, 1978, p.144; emend. Masters and Scott, 1978, p.215. Modern genus. Bolli, 1974, p.846-848 included in this *incertae sedis* genus forms which were considered by Keupp (1980b, 1980c) to be dinoflagellate cysts. Therefore, the genus *Pithonella* sensu Bolli was subdivided by Keupp, 1984 in Keupp and Mutterlose, 1984: forms which are demonstrably dinoflagellates are included in *Obliquipithonella* and *Orthopithonella;* forms of unknown affinity are retained in *Pithonella.*

PITHONELLA (cont'd)

"amplicrystallina" (Pflaumann and Krasheninnikov, 1978). NOW *Obliquipithonella.*

antarctica Rögl, 1976, p.702, pl.3, fig.1-6; pl.4, fig.1-12. Danian. Keupp (pers. comm.) suggested that this taxon may be a foraminifer.

"atlantica" Olsson and Youssefnia, 1979, p.1090, pl.2, fig.7-12. Early Campanian. *Jr syn.* of *Pithonella* (NOW *Obliquipithonella) multistrata* according to Keupp, 1981, p.30.

"bassriverensis" (Olsson and Youssefnia, 1979). NOW *Obliquipithonella.*

"bilamellata" (Pflaumann and Krasheninnikov, 1978). NOW *Obliquipithonella.*

"bollii" Rögl, 1976, p.701, pl.1, fig.1-4; pl.2, fig.1-4. Danian. *Jr syn.* of *Pithonella helentappanae* according to Keupp, 1979a, p.23. *Jr syn.* of *Pithonella* (NOW *Obliquipithonella) loeblichii* according to Keupp, 1981, p.60.

"carteri" (Bolli, 1974). NOW *Obliquipithonella.*

"compsa" (Keupp, 1982). NOW *Orthopithonella.*

"cookii" (Bolli, 1974). NOW *Obliquipithonella.*

"cylindrica" (Pflaumann and Krasheninnikov, 1978). NOW *Obliquipithonella.*

"echinosa" (Keupp, 1982). NOW *Obliquipithonella.*

"edgari" (Bolli, 1974). NOW *Obliquipithonella.*

"excentrica" Keupp, 1979c, p.660, pl.6, fig.6-12. Late Hauterivian. *Jr syn.* of *Pithonella* (NOW *Obliquipithonella) multistrata* according to Keupp, 1981, p.30.

"francadecimae" Bolli, 1974, p.855, pl.5, fig.1-4; pl.14, fig.10-12; pl.15, fig. 1-6; pl.23, fig.1. Albian. *Jr syn.* of *Pithonella* (NOW *Obliquipithonella) patriciagreeleyae* according to Keupp, 1981, p.41.

"fusiformis" (Rögl, 1976). NOW *Obliquipithonella.*

"globosa" (Fütterer, 1984). NOW *Orthopithonella.*

"gustafsonii" (Bolli, 1974). NOW *Orthopithonella.*

"guttula" Pflaumann and Krasheninnikov, 1978, p.821-822, pl.8, fig.1-4. Valanginian-Hauterivian. *Jr syn.* of *Pithonella* (NOW *Obliquipithonella) thayeri* according to Keupp, 1981, p.43.

***PITHONELLA* (cont'd)**

"hannoverana" Keupp, 1979a, p.27-29, pl.5, fig.1-9. Early Barremian. *Jr syn.* of *Obliquipithonella multistrata* according to Keupp, 1981, p.29.

"heirtzleri" (Bolli, 1974). NOW *Obliquipithonella.*

"helentappanae" Bolli, 1974, p.853, pl.2, fig.1-4; pl.10, fig.1-8; pl.21, fig.4. Barremian-Albian. *Jr syn.* of *Pithonella* (NOW *Obliquipithonella) thayeri* according to Keupp, 1981, p.43-44. See also *Obliquipithonella loeblichii.*

"johnstonei" (Bolli, 1974). NOW *Obliquipithonella.*

"krasheninnikovii" (Bolli, 1974). NOW *Obliquipithonella.*

"lepidota" (Keupp, 1982). NOW *Obliquipithonella.*

"loeblichii" (Bolli, 1974). NOW *Obliquipithonella. Jr. syn.* of *Pithonella helentappanae* according to Keupp, 1979a, p.23. Keupp, 1981, p.60, however, considered both *Pithonella* (NOW *Obliquipithonella) loeblichii* and *Pithonella helentappanae* as distinct and separate species.

"longiporosa" (Pflaumann and Krasheninnikov, 1978). NOW *Obliquipithonella.*

"loricata" (Krasheninnikov and Basov, 1983). NOW *Obliquipithonella.*

"mcnightii" (Bolli, 1974). NOW *Obliquipithonella.*

"megalithica" Keupp, 1979a, p.25-26, pl.4, fig.1-2,4; text-fig.2. Early Barremian. *Jr syn.* of *Pithonella* (NOW *Obliquipithonella) loeblichii* according to Keupp, 1981, p.60.

"miniaperta" (Krasheninnikov and Basov, 1983). NOW *Obliquipithonella.*

"multistrata" (Pflaumann and Krasheninnikov, 1978). NOW *Obliquipithonella.*

"nonarensiae" Bolli, 1974, p.853, pl.2, fig.5-8; pl.10, fig.9-12; pl.21, fig.5. Barremian-Albian. *Jr syn.* of *Pithonella* (NOW *Obliquipithonella) loeblichii* according to Keupp, 1981, p.60.

"oviformis" Keupp, 1979a, p.32-33, pl.8, fig.1-5. Early Barremian. *Jr syn.* of *Pithonella* (NOW *Obliquipithonella) thayeri* according to Keupp, 1981, p.43.

"paratabulata" Keupp, 1980, p.242-244, pl.30-31. Late Aptian. *Jr syn.* of *Pithonella* (NOW *Orthopithonella) gustafsoni* according to Keupp, 1981, p.20.

"parva" (Fütterer, 1984). NOW *Obliquipithonella.*

PITHONELLA (cont'd)

"patriciagreeleyae" (Bolli, 1974). NOW *Obliquipithonella.*

subsp. *"ovata"* (Keupp, 1979a). NOW *Obliquipithonella patriciagreeleyae* subsp. *ovata.*

"piriformis" (Keupp, 1977). NOW *Obliquipithonella.*

"porata" (Keupp, 1982). NOW *Orthopithonella.*

"porosa" (Pflaumann and Krasheninnikov, 1978). NOW *Obliquipithonella.*

forma *"obturata"* (Pflaumann and Krasheninnikov, 1978). NOW *Obliquipithonella porosa* forma *obturata.*

"pycnothecata" (Keupp, 1978). NOW *Orthopithonella.*

"quiltyi" (Bolli, 1974). NOW *Obliquipithonella.*

"robinsonii" (Bolli, 1974). NOW *Obliquipithonella.*

subsp. *"coalita"* (Keupp, 1979). NOW *Obliquipithonella robinsonii* subsp. *coalita.*

"rockeri" (Bolli, 1974). NOW *Obliquipithonella.*

"sheilasantawae" (Bolli, 1974). NOW *Obliquipithonella.*

"sliteri" (Bolli, 1980, p.528, pl.5, fig.1-12; pl.6, fig.1-6) Keupp, 1982, p.334-335. Late Hauterivian; formerly *Pirumella. Jr syn.* of *Pithonella* (NOW *Obliquipithonella) patriciagreeleyae* subsp. *ovata* according to Keupp, 1982, p.334.

"spinosa" (Keupp, 1979a) Keupp, 1981, p.65. NOW *Obliquipithonella;* formerly *Thoracosphaera.*

"squalida" (Krasheninnikov and Basov, 1983). NOW *Obliquipithonella.*

"squamosa" (Krasheninnikov and Basov, 1983). NOW *Obliquipithonella.*

"strobila" (Keupp, 1979a) Keupp, 1981, p.64. NOW *Obliquipithonella;* formerly *Thoracosphaera.*

"tanyphloia" (Keupp, 1979a). NOW *Obliquipithonella.*

"thayeri" (Bolli, 1974). NOW *Obliquipithonella.*

"titanoplax" Rögl, 1976, p.701-702, pl.1, fig.5-9; pl.2, fig.5-8. Danian. *Jr syn.* of *Pithonella* (NOW *Obliquipithonella) edgari* according to Keupp, 1981, p.64.

***PITHONELLA* (cont'd)**

"tithonica" (Keupp, 1978). NOW *Orthopithonella.*

"transitoria" (Krasheninnikov and Basov, 1983). NOW *Obliquipithonella.*

"trilamellata" Pflaumann and Krasheninnikov, 1978, p.821, pl.6, fig.3-5,7; pl.7, fig.1-2. Valanginian-?Aptian-Albian. *Jr syn.* of *Pithonella* (NOW *Obliquipithonella) robinsonii* according to Keupp, 1982, p.325.

"tuberculata" (Pflaumann and Krasheninnikov, 1978). NOW *Alasphaera.*

usheri Krasheninnikov and Basov, 1983, p.983, pl.7, fig.7-9; pl.8, fig.1-2. Maastrichtian.

"veeversii" (Bolli, 1974). NOW *Orthopithonella.*

"williambensonii" (Bolli, 1978b) Keupp, 1981, p.65. NOW *Obliquipithonella;* formerly *Bonetocardiella.*

"woodburyensis" Olsson and Youssefnia, 1979, p.1091, pl.1, fig.11; pl.2, fig.1-6. Santonian-Campanian. *Jr syn.* of *Pithonella* (NOW *Obliquipithonella) tanyphloia* according to Keupp, 1981, p.36-38.

SCHIZOSPHAERELLA Deflandre and Dangeard, 1938, p.1115-1117. According to Kälin and Bernoulli, 1984, forms in this genus may be dinoflagellates.

astraea Moshkovitz, 1979, p.458-459, pl.2, fig.1-8. Sinemurian-Pliensbachian.

**punctulata* Deflandre and Dangeard, 1938, p.1115-1117, fig.1-6. Hettangian-Kimmeridgian.

SLITERIA Krasheninnikov and Basov, 1983, p.984.

**pentagonalis* Krasheninnikov and Basov, 1983, p.984, pl.11, fig.4-9; pl.12, fig.1-8. Turonian-Early Campanian.

THORACOSPHAERA Kamptner, 1927, p.180-184. According to Tangen *et al.*, 1982, the type species of the genus, *Thoracosphaera heimi,* represents the calcareous cell wall of the vegetative phase, and not the encysted stage, of a dinoflagellate. It is considered unlikely, however, that all the species listed below are dinoflagellates. All species which are known to be dinoflagellates have been placed in *Orthopithonella* or *Obliquipithonella.*

"albatrosiana" (Kamptner, 1963). NOW *Orthopithonella.*

arctica Gilbert and Clark, 1983, p.400, pl.1, fig.1-15. Late Miocene-Holocene.

***THORACOSPHAERA* (cont'd)**

"*candora*" Kamptner, 1967, p.157, fig.100,102,105-106. *Jr syn.* of *Thoracosphaera tuberosa* Kamptner according to Fütterer, 1978, p.716.

"*corsena*" Kamptner, 1967, p.157, fig.82-85. *Jr syn.* of *Thoracosphaera heimi* (Lohmann) Kamptner according to Fütterer, 1978, p.714.

deflandrei Kamptner, 1956, p.448-455, fig.1-4. Eocene.

"*edwardsii*" Muller, 1976, p.52, pl.4, fig.3-6; pl.5, fig.6; pl.6, fig.1. *Jr syn.* of *Calciodinellum operosum* according to Fütterer, 1977, p.718.

eichstaettensis Keupp, 1978, p.88-89, fig.1-2. Early Tithonian.

granulifera Fütterer, 1978, p.715, pl.2, fig.1-12. Late Pliocene-Pleistocene.

"*granulosa*' Kamptner, 1963, p.178, fig.28. *Jr syn.* of *Thoracosphaera heimi* (Lohmann) Kamptner according to Fütterer, 1978, p.714.

*_heimi_ (Lohmann, 1920, p.117, fig.29) Kamptner, 1944, p.145. Modern; formerly *Syracosphaera*. According to Tangen *et al.*, 1982, this species represents the calcareous cell wall of the vegetative stage of a dinoflagellate. See also *Thoracosphaera corsena, T. granulosa, T. imperforata* and *T. pelagica* which are *jr synonyms* of this species.

"*imperforata*" Kamptner, 1955, p.37,66-71, pl.8, fig.98. *Jr syn.* of *Thoracosphaera heimi* (Lohmann) Kamptner according to Fütterer, 1978, p.714.

"*narena*" Kamptner, 1967, p.158, fig.96-99,101,103. *Jr syn.* of *Thoracosphaera tuberosa* (Lohmann) Kamptner according to Fütterer, 1978, p.716.

operculata Bramlette and Martini, 1964, p.305, pl.5, fig.3-7. Maastrichtian-Paleocene.

"*pelagica*" Kamptner, 1927, p.180-184, text-fig.6. Modern. This species, the original type of the genus, was considered to be a *jr syn.* of *Thoracosphaera heimi* (Lohmann) Kamptner, by Kamptner, 1944, p.145. *Thoracosphaera heimi* therefore becomes the type of the genus.

"*rela*" Kamptner, 1967, p.58, pl.19, fig.107-108. *Jr syn.* of *Thoracosphaera* (NOW *Orthopithonella) albatrosiana.*

"*ricoseta*" Kamptner, 1967, p.159, fig.87. *Jr syn.* of *Thoracosphaera* (NOW *Orthopithonella) albatrosiana* according to Fütterer, 1978, p.716.

saxea Stradner, 1961, p.84, fig.71. Danian.

"*spinosa*" (Keupp, 1979a). NOW *Obliquipithonella.*

***THORACOSPHAERA* (cont'd)**

"strobila" (Keupp, 1979a). NOW *Obliquipithonella.*

tesserula Fütterer, 1978, p.715, pl.3, fig.1-8,10-11. Paleocene-Late Oligocene.

"thoracata" Keupp, 1979a, p.19, pl.2, fig.8-11. Early Barremian. *Jr syn.* of *Pithonella* (NOW *Obliquipithonella) sheilasantaxae* according to Keupp, 1981, p.63.

tuberosa Kamptner, 1963, p.179, fig.26. Modern. See also *Thoracosphaera candora* and *T. narena* which are *jr synonyms* of this species.

APPENDIX

Included in the following list of non dinoflagellate genera (primarily acritarchs) are species which subsequently have been referred to the dinoflagellates.

BALTISPHAERIDIUM Eisenack, 1958, p.398.

"armatum" (Deflandre, 1937b) Downie and Sarjeant, 1965, p.87. NOW *Cleistosphaeridium*. Originally *Hystrichosphaeridium*.

"ashdodense" (Rossignol, 1962) Downie and Sarjeant, 1965, p.87. See *Cleistosphaeridium*. Originally *Hystrichosphaeridium*. *Jr syn.* of *Lingulodinium machaerophorum*.

"bifidum" (Clarke and Verdier, 1967). NOW *Exochosphaeridium*.

"biformoides" (Eisenack, 1954). NOW *Achilleodinium*. Originally *Hystrichosphaeridium*.

"bulbosum" (Ehrenberg, 1838). NOW *Hystrichokolpoma*.

"centrocarpum" (Deflandre and Cookson, 1955) Gerlach, 1961, p.192-193. NOW *Operculodinium;* formerly *Hystrichosphaeridium*.

"clavigerum" (Deflandre, 1937b). NOW *Florentinia*. Originally *Hystrichosphaeridium*. This species was invalidly transferred to *Baltisphaeridium* by Downie and Sarjeant, 1963, p.91.

"colligerum" (Deflandre and Cookson, 1955) Downie and Sarjeant, 1965, p.88. NOW *Diphyes*. Originally *Hystrichosphaeridium*.

"danicum" (W. Wetzel, 1952) Downie and Sarjeant, 1965, p.89. NOW *Achomosphaera*. Originally *Areoligera*.

"densicomatum" (Maier, 1959) Gerlach, 1961, p.193. NOW *?Impletosphaeridium*. Originally *Galea*.

"divergens" (Eisenack, 1954). NOW *Operculodinium*. Originally *Hystrichosphaeridium*.

"downiei" (Sarjeant, 1960a). NOW *?Acanthaulax*.

"echinoides" (Maier, 1959) Downie and Sarjeant, 1965, p.90. NOW *Cleistosphaeridium;* formerly *Hystrichosphaeridium*.

"ehrenbergii" (Deflandre, 1947c) Sarjeant, 1961a, p.103. NOW *Cleistosphaeridium*. Originally *Hystrichosphaeridium*.

"ferox" (Deflandre, 1937b) Downie and Sarjeant, 1965, p.90. NOW *Florentinia.* Originally *Hystrichosphaeridium.*

"funginum" (Morgenroth, 1966a). NOW *Lingulodinium.*

"granulosum" (Deflandre, 1937b) Sarjeant, 1962b, p.264. NOW *Prolixosphaeridium;* formerly *Hystrichosphaeridium xanthiopyxides* var. *granulosum.*

"heteracanthum" (Deflandre and Cookson, 1955) Downie and Sarjeant, 1965, p.91. NOW *?Heterosphaeridium.* Originally *Hystrichosphaeridium.*

"hirsutum" (Ehrenberg, 1838). See *Operculodinium.*

"huguoniotii" (Valensi, 1955a) Downie and Sarjeant, 1965, p.91. NOW *Cleistosphaeridium.* Originally *Hystrichosphaeridium.*

"iaculigerum" (Klement, 1960). NOW *?Operculodinium.*

"israelianum" (Rossignol, 1962) Downie and Sarjeant, 1965, p.91. NOW *Operculodinium;* formerly *Hystrichosphaeridium.*

"leve" (Maier, 1959) Sarjeant, 1964b, p.176. NOW *Cleistosphaeridium;* formerly *Galea.*

"ligospinosum" (De Coninck, 1969). NOW *Impletosphaeridium.*

"linifera" (Cookson and Eisenack, 1967b). NOW *Achomosphaera.*

"lobospinosum" (Gocht in Weiler, 1956). NOW *Chiropteridium.* Originally *Hystrichosphaeridium.*

"longifurcatum" (Firtion, 1952) Downie and Sarjeant, 1965, p.92. NOW *Surculosphaeridium;* formerly *Hystrichosphaeridium.*

"lumectum" (Sarjeant, 1960a). NOW *Cleistosphaeridium.*

"machaerophorum" (Deflandre and Cookson, 1955) Gerlach, 1961, p.191. NOW *Lingulodinium.* Originally *Hystrichosphaeridium.*

var. *"filiforme"* (Rossignol, 1964). NOW *Lingulodinium machaerophorum* subsp. *filiforme.*

var. *"megacanthum"* (Rossignol, 1964). NOW *Lingulodinium machaerophorum* subsp. *megacanthum.*

var. *"strangulatum"* (Rossignol, 1964). NOW *Lingulodinium machaerophorum* subsp. *strangulatum.*

"mariannae" (Philippot, 1949) Downie and Sarjeant, 1965, p.92. NOW *Achomosphaera.* Originally *Hystrichosphaeridium.*

"mixtispinosum" (Klement, 1960). NOW *Prolixosphaeridium.*

"multifurcatum" (Deflandre, 1937b) Klement, 1960, p.59. NOW *?Cleistosphaeridium.* Originally *Hystrichosphaeridium.*

"multispinosum" (Ch. Singh, 1964). NOW *?Cleistosphaeridium.*

"neptuni" (Eisenack, 1958). NOW *?Achomosphaera.*

"oligacanthum" (W. Wetzel, 1952) Downie and Sarjeant, 1965, p.93. NOW *Laticavodinium.* Originally *Hystrichosphaeridium.*

subsp. *"complanatum"* (W. Wetzel, 1952) Downie and Sarjeant, 1965, p.93. NOW *Solisphaeridium stimuliferum* subsp. *complanatum,* an acritarch. Originally *Hystrichosphaeridium oligacanthum* subsp. *complanatum.* Note orthographic error in Downie and Sarjeant, *op.cit.*

subsp. *"granulatum"* (W. Wetzel, 1952) Downie and Sarjeant, 1965, p.93. NOW *Surculosphaeridium granulatum.* Originally *Hystrichosphaeridium oligacanthum* subsp. *granulatum.* Note orthographic error in Downie and Sarjeant, *op.cit.*

subsp. *"stella"* (W. Wetzel, 1952) Downie and Sarjeant, 1965, p.93. NOW *Surculosphaeridium phoenix* subsp. *stella.* Originally *Hystrichosphaeridium oligacanthum* subsp. *stella.* Note orthographic error in Downie and Sarjeant, *op.cit.*

subsp. *"velatum"* (W. Wetzel, 1952) Downie and Sarjeant, 1965, p.93. NOW *?Cauca velata.* Originally *Hystrichosphaeridium oligacanthum* subsp. *velata.* Note orthographic error in Downie and Sarjeant, *op.cit.*

"palmatum" (Deflandre and Courteville, 1939) Downie and Sarjeant, 1965, p.94. NOW *?Exochosphaeridium.* Originally *Hystrichosphaeridium.*

"panniforme" (Gerlach, 1961). See *Cleistosphaeridium. Jr syn.* of *Systematophora placacantha.*

"parvispinum" (Deflandre, 1937b) Downie and Sarjeant, 1965, p.94. NOW *Prolixosphaeridium;* formerly *Hystrichosphaeridium.*

"pattei" (Valensi, 1948) Downie and Sarjeant, 1965, p.94. NOW *?Lanterna.* Originally *Hystrichosphaeridium.*

"pectiniforme" (Gerlach, 1961). NOW *?Areosphaeridium.*

"pilosum" (Ehrenberg, 1854) Sarjeant, 1961a, p.101. NOW *Sentusidinium.* Originally *Xanthidium.*

subsp. *"longispinosa"* (Sarjeant, 1961a). See *Tenua pilosa* subsp. *longispinosa. Jr syn.* of *Prolixosphaeridium granulosum.*

"placacanthum" (Deflandre and Cookson, 1955) Downie and Sarjeant, 1965, p.94. NOW *Systematophora*. Originally *Hystrichosphaeridium*.

"polyozon" (Brosius, 1963). NOW *?Cleistosphaeridium*.

"polytrichum" (Valensi, 1947) Downie and Sarjeant, 1965, p.95. NOW *Cleistosphaeridium*. Originally *Hystrichosphaeridium*.

"pseudhystrichodinium" (Deflandre, 1937b) Downie and Sarjeant, 1965, p.95. NOW *Pervosphaeridium*. Originally *Hystrichosphaeridium*.

subsp. *"magnum"* (W. Wetzel, 1955). NOW *Coronifera oceanica* subsp. *magna*. Originally *Hystrichosphaeridium pseudhystrichodinium* subsp. *magnum*.

"ramuliferum" (Deflandre, 1937b). NOW *Achomosphaera*. Originally *Hystrichosphaeridium*.

"reginaldii" (Mantell, 1844) Downie and Sarjeant, 1965, p.95. NOW *Spiniferites*. Originally *Xanthidium*.

"septatum" (Cookson and Eisenack, 1967b). NOW *Hafniasphaera*.

"severinii" (Cookson and Cranwell, 1967). NOW *Operculodinium*.

"spinosum" (White, 1842) Downie and Sarjeant, 1965, p.96. NOW *?Exochosphaeridium*. Originally *Xanthidium*.

var. *"deflandrei"* (Lejeune-Carpentier, 1941) Downie and Sarjeant, 1965, p.96. NOW *?Fibrocysta deflandrei*. Originally *Hystrichosphaeridium spinosum* var. *deflandrei*.

"spiralisetum" (de Wit, 1943) Downie and Sarjeant, 1965, p.97. NOW *Cleistosphaeridium*. Originally *Hystrichosphaeridium*.

"striatoconus" (Deflandre and Cookson, 1955) Downie and Sarjeant, 1965, p.97. NOW *Conosphaeridium*. Originally *Hystrichosphaeridium*.

"striolatum" (Deflandre, 1937b) Downie and Sarjeant, 1965, p.97. NOW *Coronifera*. Originally *Hystrichosphaeridium*.

"tiara" (Klumpp, 1953) Downie and Sarjeant, 1965, p.97. NOW *Operculodinium*. Originally *Hystrichosphaeridium*.

"triangulatum" (Gerlach, 1961). NOW *Achomosphaera*.

"tribuliferum" (Sarjeant, 1962a). NOW *?Cleistosphaeridium*.

"tridactylites" (Valensi, 1955a) Downie and Sarjeant, 1965, p.97. NOW *Florentinia*. Originally *Hystrichosphaeridium*.

"tripodes" (Morzadec-Kerfourn, 1966). NOW *?Spiniferites.*

"twistringense" (Maier, 1959) Sarjeant, 1964b, p.176. NOW *Areoligera;* formerly *Galea.*

"varispinosum" (Sarjeant, 1959). NOW *Cleistosphaeridium.*

"vestitum" (Deflandre, 1938b) Sarjeant, 1960b, p.397. NOW *Systematophora.* Originally *Hystrichosphaeridium.* See also *?Surculosphaeridium.*

"whitei" (Deflandre and Courteville, 1939) Downie and Sarjeant, 1965, p.98. NOW *?Cometodinium.* Originally *Hystrichosphaeridium.*

"xanthiopyxides" (O. Wetzel, 1933b) Downie and Sarjeant, 1965, p.98. NOW *Tanyosphaeridium.* Originally *Hystrichosphaera.*

CYMATIOSPHAERA O. Wetzel, 1933b, p.27, emend. Deflandre, 1954, p.257.

"cingulata" (O. Wetzel, 1933b). NOW *Pterodinium.*

"pterota" (Cookson and Eisenack, 1958). See *?Spiniferites. Jr syn.* of *Pterodinium cingulatum.*

"striata" (Cookson and Eisenack, 1960a). NOW *Heslertonia.*

"teichophera" (Sarjeant, 1961a). NOW *Heslertonia.*

DOMASIA Downie, 1960, p.199.

"discophora" (Cookson and Eisenack, 1962b). NOW *Domasiella.*

GEODIA Lamarck, 1815. This is a genus of sponge spicules to which Merrill, 1895 referred the following dinoflagellate species.

"austinii" (Merrill, 1895). NOW *?Systematophora.*

"hillii" (Merrill, 1895). NOW *Hystrichosphaeridium.*

"irregularis" (Merrill, 1895). NOW *Hystrichosphaeridium.*

"spini-pansata" (Merrill, 1895). NOW *Hystrichosphaeridium.*

"tripunctata" (Merrill, 1895). *Jr syn.* of *Hystrichosphaera furcata;* see Sarjeant, 1964b, p.175, and therefore now considered to be a *jr syn.* of *Spiniferites ramosus.* See comments under *Hystrichosphaera* and *Spiniferites.*

LEIOFUSA Eisenack 1938a, p.28.

"lidiae" (Gorka, 1963). NOW *Palaeocystodinium.*

LEIOSPHAERIDIA Eisenack, 1958, p.2; emend. Downie and Sarjeant, 1963, p.94.

"*scrobiculata*" (Deflandre and Cookson, 1955). NOW *Batiacasphaera.*

"*similis* (Cookson and Eisenack, 1960b). NOW *Nummus.*

"*trematophora*" (Cookson and Eisenack, 1967a). NOW *Cyclopsiella.*

MICRHYSTRIDIUM Deflandre, 1937b, p.79; emend. Lister, 1970, p.77.

"*fucosum*" (Valensi, 1955a). NOW *?Dapsilidinium.*

"*paulinae*" (Valensi, 1953). NOW *?Dapsilidinium.*

"*veligerum*" (Deflandre, 1937b). NOW *Rhiptocorys.*

PTEROSPERMOPSIS W. Wetzel, 1952, p.411.

"*pelagica*" (Eisenack, 1954). NOW *Thalassiphora.*

"*?vancampoae*" (Rossignol, 1962). NOW *Tuberculodinium.*

REFERENCES

Agelopoulos, J.

1964: *Hystrichostrogylon membraniphorum* n.g. n.sp. aus dem Heiligenhafener Kieselton (Eozän); Neues Jahrbuch für Geologie und Paläontologie, Monatshefte, p.673-675.

1967: Hystrichosphären, Dinoflagellaten und Foraminiferen aus dem eozänen Kieselton von Heiligenhafen, Holstein; Dissertation Math.-Naturwiss. Fak. Eberhard-Karls-Univ. Tübingen, p.1-74, pl.1-14.

Alberti, G.

1959a: Über *Pseudodeflandrea* n.gen. (Dinoflag.) aus dem Mittel-Oligozän von Norddeutschland; Mitteilungen aus dem Geologischen Staatsinstitut in Hamburg, v.28, p.91-92, pl.1.

1959b: Zur Kenntnis der Gattung *Deflandrea* Eisenack (Dinoflag.) in der Kreide und im Alttertiär Nord- und Mitteldeutschlands; Mitteilungen aus dem Geologischen Staatsinstitut in Hamburg, v.28, p.93-105, pl.8-9.

1961: Zur Kenntnis mesozoischer und alttertiärer Dinoflagellaten und Hystrichosphaerideen von Nord- und Mitteldeutschland sowie einigen anderen europäischen Gebieten; Palaeontographica, Abt. A, v.116, p.1-58, pl.1-12.

Anderson, R.Y.

1960: Cretaceous-Tertiary palynology, eastern side of the San Juan Basin, New Mexico; State Bureau of Mines and Mineral Resources, New Mexico Institute of Mining and Technology, Memoir 6, p.1-59, pl.1-11.

Antonescu, E.

1974: Un nouveau genre de Dinoflagellê dans le Jurassique moyen de Roumanie; Revue de Micropalêontologie, v.17, p.61-65, pl.1.

Archangelsky, S.

1969a: Sobre el paleomicroplancton del Terciario inferior de Rio Turbio, Provincia de Santa Cruz; Ameghiniana, v.5, p.406-416, pl.1-2.

1969b: Estudio del paleomicroplancton de la Formacion Rio Turbio (Eoceno), Provincia de Santa Cruz; Ameghiniana, v.6, p.181-218, pl.1-5.

Artzner, D.G. and Dörhöfer, G.

1978: Taxonomic note: *Lejeunecysta nom, nov. pro. Lejeunia* Gerlach 1961 emend. Lentin and Williams 1976 - dinoflagellate cyst genus; Canadian Journal of Botany, v.56, p.1381-1382.

Ashraf, A.R.

1979: Die räto-jurassischen Floren des Iran und Afghanistans. 6. Jurassische und unterkretazische Dinoflagellaten und Acritarchen aus Nordafghanistan; Palaeontographica, Abt.B, v.169, p.122-158, pl.1-11.

Aurisano, R.W.

1984: Three new dinoflagellate species from the subsurface Upper Cretaceous Atlantic Coastal Plain of New Jersey; Journal of Paleontology, v.58, no.1, p.1-8, fig.3-4.

Baksi, S.K.

1962: Palynological investigation of Simsang River Tertiaries, south Shillong Front, Assam; Geological, Mining and Metallurgical Society of India, Bulletin 26, p.1-22, pl.1-5.

Baltes, N.

1963: Dinoflagellate si Hystrichosphaeride cretacice din Platforma moezica; Petrol si Gaze, v.14, p.581-589, pl.1-8.

1969: Distribution stratigraphique des dinoflagellés et des acritarches tertiaires en Roumanie; *in* Brönnimann, P. and Renz, H.H. (eds.) Proceedings First International Conference Planktonic Microfossils, Geneva, 1967, E.J. Brill, Leiden, v.1, p.26-45, pl.1-5.

1971: Pliocene Dinoflagellata and Acritarcha in Romania; *in* Farinacci, A. (ed.) Proceedings Second Planktonic Conference Rome 1970, Edizioni Technoscienza, Rome, v.1, p.1-19, pl.1-5.

Banner, F.T.

1972: *Pithonella ovalis* from the early Cenomanian of England; Micropaleontology, v.18, no.3, p.278-284, pl.1-2.

Bein, A. and Reiss, Z.

1976: Cretaceous *Pithonella* from Israel; Micropaleontology, v.22, no.1, p.83-91, pl.1-3.

Beju, D.

1969: Jurassic microplankton from the Carpathian Foreland of Roumania; Colloquium on the Mediterranean Jurassic; Budapest 3-8 Sept., 1969, pl.1-8, preprint. Not validly published in accordance with I.C.B.N. Art.45c.

1971: Jurassic microplankton from the Carpathian Foreland of Roumania; Annales Instituti Geologici Publici Hungarici, v.54, p.275-302, pl.1-8.

1979: A new dinoflagellate cyst from the Middle Jurassic of England; Neues Jahrbuch für Geologie und Paläontologie, Monatshefte, p.1-6.

1983: *Burtonia polygonalis*, a new dinoflagellate from the Bathonian of southern England; Journal of Paleontology, v.57, p.106-111.

Below, R.

1981a: Dinoflagellaten-Zysten aus dem oberen Hauterive bis unteren Cenoman Süd-West-Marokkos; Palaeontographica, Abt.B, v.176, p.1-145, pl.1-15.

1981b: Dinoflagellaten-Zysten aus dem Platylenticeras-Schichten (unteres Mittel-Valendis) der Ziegeleitongrube Schnepper in Suddendorf/Nordwest-Deutschland; Newsl. Stratigr., v.10, no.2, p.115-125, pl.1.

1982a: Dinoflagellate cysts from Valanginian to Lower Hauterivian sections near Ait Hamouch, Morocco; Revista Española de Micropaleontologia, v.14, p.23-52, pl.1-4.

1982b: *Rigaudella,* ein neues Genus von Dinoflagellaten-Zysten; Neues Jahrbuch für Geologie und Paläontologie, Monatshefte, p.137-150.

1982c: Scolochorate zysten der Gonyaulacacean (Dinophyceae) aus der Unterkreide Marokkos; Paleontographica, Abt. B, v.182, p.1-51, pl.1-9.

1982d: Zur Kenntnis der Dinoflagellaten-Zysten-Populationen im Ober Apt der Tongrube "Otto Gott" in Sarstedt/Norddeutschland; Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, v.164, p.339-363.

1984: Aptian to Cenomanian dinoflagellate cysts from the Mazagan Plateau, northwest Africa (Sites 545 and 547, Deep Sea Drilling Project Leg 79); *in* Hinz, K., Winterer, E.L. *et al.*, Initial Reports of the Deep Sea Drilling Project, Volume LXXIX, Washington, p.621-649, pl.1-10.

Benedek, P.N.
1972: Phytoplanktonten aus dem Mittel- und Oberoligozän von Tönisberg (Niederrheingebiet); Palaeontographica, Abt.B, v.137, p.1-71, pl.1-16.

Benedek, P.N. and Gocht, H.
1981: *Thalassiphora pelagica* (Dinoflagellata, Tertiär): electronenmikroskopische Untersuchung und Gedanken zur Paläobiologie; Palaeontographica, Abt. B, v.180, p.39-64, pl.1-5.

Benedek, P.N., Gocht, H. and Sarjeant, W.A.S.
1982: The dinoflagellate cyst genus *Pentadinium* Gerlach: a re-examination; Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, v.162, p.265-285.

Benedek, P.N. and Sarjeant, W.A.S.
1981: Dinoflagellate cysts from the Middle and Upper Oligocene of Tönisberg (Niederrheingebiet): a morphological and taxonomic restudy; Nova Hedwigia, v.35, p.313-356, 6 plates.

Benson, D.G.
1976: Dinoflagellate taxonomy and biostratigraphy at the Cretaceous-Tertiary boundary, Round Bay, Maryland; Tulane Studies in Geology and Paleontology, v.12, p.169-233.

Biffi, U. and Grignani, D.
1983: Peridinioid dinoflagellate cysts from the Oligocene of the Niger Delta, Nigeria; Micropaleontology, v.29, no.2, p.126-145, pl.1-7.

Bignot, G. and Lezaud, L.
1964. Contribution à l'étude des Pithonelles de la craie parisienne; Revue de Micropaléontologie, v.7, no.2, p.138-152.

Bint, A.N.
1983: *Umbodinium crustov* gen. et sp. nov., a peridinioid dinoflagellate with two intercalaries from the Albian of Kansas; Palynology, v.7, p.171-182, pl.1.

Bjaerke, T.
1980: Mesozoic palynology of Svalbard IV, Toarcian dinoflagellates from Spitsbergen; Palynology, v.4, p.57-77, pl.1-5.

Bolli, H.M.
1974: Jurassic and Cretaceous Calcisphaerulidae from D.S.D.P. Leg 27, Eastern Indian Ocean; *in* Veevers, J.J., Heirtzler, J.R., *et al.*, Initial Reports of the Deep Sea Drilling Project, Volume XXVII, Washington, p.843-907, pl.1-24.

1978a: Cretaceous and Paleogene Calcisphaerulidae from D.S.D.P. Leg 40, southeastern Atlantic; *in* Bolli, H.M., Ryan, W.B.F., *et al.*, Initial Reports of the Deep Sea Drilling Project, Volume XL, Washington, p.819-838, pl.1-7.

1978b: Upper Jurassic Calcisphaerulidae from D.S.D.P. Leg 44, Hole 391C, Blake-Bahama Basin, western North Atlantic; *in* Benson, W.E., Sheridan, R.E., *et al.*, Initial Reports of the Deep Sea Drilling Project, Volume XLIV, Washington, p.911-919, pl.1-3.

1980: Calcisphaerulidae and Calpionellidae from the Upper Jurassic and Lower Cretaceous of D.S.D.P. Hole 416A, Moroccan Basin; *in* Lancelot, Y, Winterer, E.L. *et al.*, Initial Reports of the Deep Sea Drilling Project, Volume L, Washington, p.525-543, pl.1-7.

Boltenhagen, E.
1977: Microplancton du Crétacé supérieur du Gabon; Cahiers de Paléontologie, C.N.R.S., p.1-50, pl.1-25.

Bonet, F.
1956: Zonification Microfaunistica de las Calizas Cretácicas del Este de México; XX Congreso Geologico International, p.3-102, pl.1-31.

Bradford, M.R.
1975: New dinoflagellate cyst genera from the recent sediments of the Persian Gulf; Canadian Journal of Botany, v.53, p.3064-3074.

1977: New species attributable to the dinoflagellate cyst genus *Lejeunia* Gerlach, 1961, emend. Lentin and Williams, 1975; Grana, v.16, p.45-59.

Bradford, M.R. and Wall, D.A.
1984: The distribution of Recent organic-walled dinoflagellate cysts in the Persian Gulf, Gulf of Oman, and Northwestern Arabian Sea; Palaeontographica, Abt.B, v.192, p.16-84, pl.1-6.

Brideaux, W.W.

1971: Palynology of the Lower Colorado Group, central Alberta, Canada, I. Introductory remarks. Geology and microplankton studies; Palaeontographica, Abt.B, v.135, p.53-114, pl.21-30.

1975: Taxonomic note: redefinition of the genus *Broomea* and its relationship to *Batioladinium* gen. nov. (Cretaceous); Canadian Journal of Botany, v.53, p.1239-1243.

1977: Taxonomy of Upper Jurassic-Lower Cretaceous microplankton from the Richardson Mountains, District of Mackenzie, Canada; Geological Survey of Canada, Bulletin 281, p.1-89, pl.1-16.

Brideaux, W.W. and Fisher, M.J.

1976: Upper Jurassic-Lower Cretaceous dinoflagellate assemblages from Arctic Canada; Geological Survey of Canada, Bulletin 259, p.1-53, pl.1-7.

Brideaux, W.W. and McIntyre, D.J.

1973: *Lunatadinium dissolutum* gen. et sp. nov., a dinoflagellate cyst from Lower Cretaceous rocks, Yukon Territory and northern District of Mackenzie; Bulletin of Canadian Petroleum Geology, v.21, p.395-402, pl.1.

1975: Miospores and microplankton from Aptian-Albian rocks along Horton River, District of Mackenzie; Geological Survey of Canada, Bulletin 252, p.1-85, pl.1-14.

Brito, I.M.

1967: Silurian and Devonian Acritarcha from Maranhao Basin, Brazil; Micropaleontology, v.13, p.473-482, pl.1-2.

Brosius, M.

1963: Plankton aus dem nordhessischen Kasseler Meeressand (Oberoligozän); Zeitschrift der Deutschen geologischen Gesellschaft, v.114, p.32-56, pl. 1-8.

Bujak, J.P.

1976: An evolutionary series of Late Eocene dinoflagellate cysts from southern England; Marine Micropaleontology, v.1, p.101-117, pl.1-4.

1979: Proposed phylogeny of the dinoflagellates *Rhombodinium* and *Gochtodinium;* Micropaleontology, v.25, p.308-324, pl.1-3.

1980: Dinoflagellate cysts and acritarchs from the Eocene Barton Beds of southern England; *in* Bujak, J.P., Downie, C., Eaton, G.L., and Williams, G.L., Dinoflagellate cysts and acritarchs from the Eocene of southern England; The Palaeontological Association, Special Papers in Palaeontology, no.24, p.36-91.

1984: Cenozoic dinoflagellate cysts and acritarchs from the Bering Sea and northern North Pacific, D.S.D.P. Leg 19; Micropaleontology, v.30, no.2, p.180-212, pl.1-4.

Bujak, J.P. and Davies, E.H.
1983: Modern and fossil Peridiniineae; American Association of Stratigraphic Palynologists, Contributions Series, no.13, p.1-203, pl.1-12.

Bujak, J.P., Downie, C., Eaton, G.L. and Williams, G.L.
1980: Taxonomy of some Eocene dinoflagellate cyst species from southern England; *in* Bujak, J.P., Downie, C., Eaton, G.L., and Williams, G.L., Dinoflagellate cysts and acritarchs from the Eocene of southern England; The Palaeontological Association, Special Papers in Palaeontology, no.24, p.26-36.

Bujak, J.P. and Fisher, M.J.
1976: Dinoflagellate cysts from the Upper Triassic of arctic Canada; Micropaleontology, v.22, p.44-70, pl.1-9.

Burger, D.
1980a: Palynology of the Lower Cretaceous in the Surat Basin; Australian Bureau of Mineral Resources, Bulletin 189, p.1-106, pl.1-48.

1980b: Early Cretaceous (Neocomian) microplankton from the Carpentaria Basin, northern Queensland; Alcheringa, v.4, p.263-279.

Burgess, J.D.
1971: Palynological interpretation of Frontier environments in central Wyoming; Geoscience and Man, v.3, p.69-82, pl.1.

Bütschli, O.
1873: Einiges über Infusorien; Archiv für mikroskopische Anatomie v.9, p.657-678, pl.25-26.

Calandra, F.
1964: Sur un présumé dinoflagellé *Arpylorus* nov. gen. du Gothlandien de Tunisie; Comptes rendus de l'Académie des sciences, Paris, v.258, p.4112-4114.

Caro, Y.
1973: Contribution à la connaissance des dinoflagellés du Paléocène-Eocène inférieur des Pyrenées espagnoles; Revista Española de Micropaleontologia, v.5, p.329-372, pl.1-5.

Châteauneuf, J.-J.
1980: Palynostratigraphie et Paléoclimatologie de l'Eocène supérieur et de l'Oligocène du Bassin de Paris; Bureau des Recherches Geologiques et Minières, Mémoir 116, p.1-360, pl.1-31.

Châteauneuf, J.-J. and Gruas-Cavagnetto, C.
1978: Les zones de Wetzeliellaceae (Dinophyceae) du bassin de Paris; Bulletin du Bureau des Recherches Geologiques et Minières (deuxième série), Section IV; no.2-1978, p.59-93, pl.1-5.

Chen, Yow-yuh.
1982: Recognition of the dinocyst genus *Komewuia* with assignable species from Madagascar; Micropaleontology, v.28, p.31-42, pl.1-3.

Churchill, D.M. and Sarjeant, W.A.S.
1963: Freshwater microplankton from Flandrian (Holocene) peats of south-western Australia; Grana Palynologica, v.3, p.29-53, pl.1-2.

Claparède, E. and Lachmann, J.
1859: Etudes sur les Infusoires et les Rhizopodes; Mémoires de l'Institut national génevois, 6(mém.1), p.261-482.

Clarke, R.F.A., Davey, R.J., Sarjeant, W.A.S. and Verdier, J.-P.
1968: A note on the nomenclature of some Upper Cretaceous and Eocene dinoflagellate taxa; Taxon, v.17, p.181-183.

Clarke, R.F.A. and Verdier, J.-P.
1967: An investigation of microplankton assemblages from the Chalk of the Isle of Wight, England; Verhandelingen der Koninklijke Nederlandsche Akademie van Wetenschappen, Afdeeling Natuurkunde, Eerste Reeks, v.24, p.1-96, pl.1-17.

Conrad, W.
1941: Notes protistologiques XIX. Quelques microfossiles des silex crêtacés; Musée Royal d'Histoire Naturelle de Belgique, Bulletin, v.17, p.1-10, pl.1.

Conway, B.H.
1978: Microplankton from the Upper Bathonian of Zohar 5 and Yinnon 1 boreholes in southern Israel; Review of Palaeobotany and Palynology, v.26, p.337-362.

Conway, B.H. and Cousminer, H.L.
1983: Transfer of *Sarjeantia triassica* (Dinophyceae) to *Aratisporites fimbriatus* (Sporites, Monoletes); Grana, v.22, p.35-38.

Cookson, I.C.
1953: Records of the occurrence of *Botryococcus braunii, Pediastrum* and the Hystrichosphaerideae in Cainozoic deposits of Australia; National Museum, Melbourne. Memoir no.18, p.107-123, pl.1-2.

1956: Additional microplankton from Australian Late Mesozoic and Tertiary sediments; Australian Journal of Marine and Freshwater Research, v.7, p.183-191, pl.1-2.

1965a: Cretaceous and Tertiary microplankton from southeastern Australia; Proceedings of the Royal Society of Victoria, v.78, p.85-93, pl.9-11.

1965b: Microplankton from the Paleocene Pebble Point Formation, south-western Victoria; Proceedings of the Royal Society of Victoria, v.78, p.137-141, pl.24-25.

Cookson, I.C. and Cranwell, L.M.
1967: Lower Tertiary microplankton, spores and pollen grains from southernmost Chile; Micropaleontology, v.13, p.204-216, pl.1-3.

Cookson, I.C. and Eisenack, A.
1958: Microplankton from Australian and New Guinea Upper Mesozoic sediments; Proceedings of the Royal Society of Victoria, v.70, p.19-79, pl.1-12.

1960a: Microplankton from Australian Cretaceous sediments; Micropaleontology, v.6, p.1-18, pl.13.

1960b: Upper Mesozoic microplankton from Australia and New Guinea; Palaeontology, v.2, p.243-261, pl.37-39.

1961a: Upper Cretaceous microplankton from the Belfast No. 4 Bore, south-western Victoria; Proceedings of the Royal Society of Victoria, v.74, p.69-76, pl.11-12.

1961b: Tertiary microplankton from the Rottnest Island Bore, Western Australia; Journal of the Royal Society of Western Australia, v.44, p.39-47, pl.1-2.

1962a: Some Cretaceous and Tertiary microfossils from Western Australia; Proceedings of the Royal Society of Victoria, v.75, p.269-273, pl.37.

1962b: Additional microplankton from Australian Cretaceous sediments; Micropaleontology, v.8, p.485-507, pl.1-7.

1965a: Microplankton from the Browns Creek Clays, SW. Victoria; Proceedings of the Royal Society of Victoria, v.79, p.119-131, pl.11-15.

1965b: Microplankton from the Dartmoor Formation, SW. Victoria; Proceedings of the Royal Society of Victoria, v.79, p.133-137, pl.16-17.

1965c: Microplankton from the Paleocene Pebble Point Formation, south-western Victoria; Proceedings of the Royal Society of Victoria, v.79, p.139-146, pl.18-19.

1967a: Some Early Tertiary microplankton and pollen grains from a deposit near Strahan, western Tasmania; Proceedings of the Royal Society of Victoria, v.80, p.131-140, pl.17-21.

1967b: Some microplankton from the Paleocene Rivernook Bed, Victoria; Proceedings of the Royal Society of Victoria, v.80, p.247-257, pl.39-42.

1968: Microplankton from two samples from Gingin Brook No. 4 Borehole, Western Australia; Journal of the Royal Society of Western Australia, v.51, p.110-122.

1969: Some microplankton from two bores at Balcatta, Western Australia; Journal of the Royal Society of Western Australia, v.52, p.3-8.

1970a: Cretaceous microplankton from the Eucla Basin, Western Australia; Proceedings of the Royal Society of Victoria, v.83, p.137-157, pl.10-14.

1970b: Die Familie der Lecaniellaceae n. fam. - Fossile Chlorophyta, Volvocales? Neues Jahrbuch für Geologie und Paläontologie, Monatshefte, p.321-325.

1971: Cretaceous microplankton from Eyre No. 1 Bore Core 20, Western Australia; Proceedings of the Royal Society of Victoria, v.84, p.217-226, pl.7-11.

1974: Mikroplankton aus australischen mesozoischen und tertiären Sedimenten; Palaeontographica, Abt.B, v.148, p.44-93, pl.20-29.

1982: Mikrofossilien aus australischen mesozoischen und tertiären Sedimenten. Zweiter Teil; Palaeontographica, Abt.B., v.184, p.23-63, pl.1-9.

Cookson, I.C. and Hughes, N.F.
1964: Microplankton from the Cambridge Greensand (mid-Cretaceous); Palaeontology, v.7, p.37-59, pl.5-11.

Cookson, I.C. and Manum, S.
1964: On *Deflandrea victoriensis* n. sp., *D. tripartita* Cookson and Eisenack, and related species; Proceedings of the Royal Society of Victoria, v.77, p.521-524, pl.76.

Corradini, D.
1973: Non-calcareous microplankton from the Upper Cretaceous of the Northern Apennines; Bollettino della Societá Paleontologica Italiana, v.11, p.119- 197, pl.19-39.

Costa, L.I., Dennison, C. and Downie, C.
1978: The Paleocene/Eocene boundary in the Anglo-Paris Basin; Journal of the Geological Society, v.135, p.261-264.

Costa, L.I. and Downie, C.
1976: The distribution of the dinoflagellate *Wetzeliella* in the Palaeogene of north-western Europe; Palaeontology, v.19, p.591-614, pl.92.

1979: The Wetzeliellaceae; Palaeogene dinoflagellates; Proceedings IV International Palynology Conference, Lucknow, (1976-77), v.2, p.34-46.

Courtinat, B. and Gaillard, C.
1980: Les dinoflagellés des calcaires lites de Trept (Oxfordien supérieur). Inventaire et repartition comparée à celle de la microfaune benthique; Documents des Laboratoires de Géologie de la Faculté des Sciences de Lyon, no.78, p.1-123, pl.1-10.

Damassa, S.P.

1979a: Eocene dinoflagellates from the Coastal Belt of the Franciscan Complex, northern California; Journal of Paleontology, v.53, p.815-840, pl.1-8.

1979b: Danian dinoflagellates from the Franciscan Complex, Mendocino County, California; Palynology, v.3, p.191-207, pl.1-5.

1984: Morphologic variability and paraplate configuration of the dinoflagellate genus *Danea* Morgenroth, 1968; Palynology, v.8, p.51-69, pl.1-6.

Davey, R.J.

1968: *Gonyaulacysta parorthoceras*, a new species of dinoflagellate cyst; Palaeontologia Africana, v.11, p.1.

1969a: Non-calcareous microplankton from the Cenomanian of England, northern France and North America, Part I; Bulletin of the British Museum (Natural History) Geology, v.17, p.103-180, pl.1-11.

1969b: Some dinoflagellate cysts from the Upper Cretaceous of northern Natal, South Africa; Palaeontologia Africana, v.12, p.1-23, pl.1-4.

1969c: The evolution of certain Upper Cretaceous hystrichospheres from South Africa; Palaeontologia Africana, v.12, p.25-51, pl.1-4.

1970: Non-calcareous microplankton from the Cenomanian of England, northern France and North America, Part II; Bulletin of the British Museum (Natural History) Geology, v.18, p.333-397, pl.1-10.

1974: Dinoflagellate cysts from the Barremian of the Speeton Clay, England; *in* Symposium on Stratigraphic Palynology, Birbal Sahni Institute of Palaeobotany, Special Publication no.3, p.41-75, pl.1-9.

1975: A dinoflagellate cyst assemblage from the Late Cretaceous of Ghana; Proceedings of the 5th West African Colloquium on Micropaleontology, ser.7, no.5, p.150-173, pl.1-3.

1978: Marine Cretaceous palynology of Site 361, D.S.D.P. Leg 40, off southwestern Africa; *in* Bolli, H.M., Ryan, W.B.F., *et al.*, Initial Reports of the Deep Sea Drilling Project, Volume XL, Washington, p.883-913, pl.1-9.

1979a: Two new early Cretaceous dinocyst species from the northern North Sea; Palaeontology, v.22, p.427-437, pl.48-50.

1979b: Marine Apto-Albian palynomorphs from Holes 400A and 402A, IPOD Leg 48, northern Bay of Biscay; *in* Montadert, L., Roberts, D.G., *et al.*, Initial Reports of the Deep Sea Drilling Project, Volume XLVIII, Washington, p.547-577, pl.1-8.

1979c: The stratigraphic distribution of dinocysts in the Portlandian (latest Jurassic) to Barremian (Early Cretaceous) of northwest Europe; American Association of Stratigraphic Palynologists, Contributions Series 5B, p.48-81, pl.1-4.

1979d: A re-appraisal of the genus *Chytroeisphaeridia* Sarjeant, 1962; Palynology, v.3, p.209-218, pl.1-2.

1982a: Die Verbreitung der Palynomorphen im späten Apt und frühen Alb Nordwestdeutschlands; Geologische Jahresberichte, Hannover, v.A65, p.365-403, pl.6.3-1-6.3-6.

1982b: Dinocyst stratigraphy of the latest Jurassic to Early Cretaceous of the Haldager No. 1 borehole, Denmark; Geological Survey of Denmark, Series B, No.6, p.1-57, pl.1-10.

Davey, R.J., Downie, C., Sarjeant, W.A.S. and Williams, G.L.
1966: Fossil dinoflagellate cysts attributed to *Baltisphaeridium*; *in* Davey, R.J., Downie, C., Sarjeant, W.A.S. and Williams, G.L., Studies on Mesozoic and Cainozoic dinoflagellate cysts; Bulletin of the British Museum (Natural History) Geology, Supplement 3, p.157-175.

1969: Generic reallocations; *in* Davey, R.J., Downie, C., Sarjeant, W.A.S. and Williams, G.L., Appendix to "Studies on Mesozoic and Cainozoic dinoflagellate cysts", Bulletin of the British Museum (Natural History) Geology, Appendix to Supplement 3, p.15-17.

Davey, R.J. and Verdier, J.-P.
1971: An investigation of microplankton assemblages from the Albian of the Paris Basin; Verhandelingen der Koninklijke Nederlandsche Akademie van Wetenschappen, Afdeling Natuurkunde, Eerste Reeks, v.26, p.1-58, pl.1-7.

1973: An investigation of microplankton assemblages from latest Albian (Vraconian) sediments; Revista Española Micropaleontologia, v.5, p.173-212, pl.1-5.

1974: Dinoflagellate cysts from the Aptian type sections at Gargas and La Bédoule, France; Palaeontology, v.17, p.623-653, pl.91-93.

1976: A review of certain non-tabulate Cretaceous hystrichospherid dinocysts; Review of Palaeobotany and Palynology, v.22, p.307-335, pl.1-4.

Davey, R.J. and Williams, G.L.
1966a: The genera *Hystrichosphaera* and *Achomosphaera*; *in* Davey, R.J., Downie, C., Sarjeant, W.A.S. and Williams, G.L., Studies on Mesozoic and Cainozoic dinoflagellate cysts; Bulletin of the British Museum (Natural History) Geology, Supplement 3, p.28-52.

1966b: The genus *Hystrichosphaeridium* and its allies; *in* Davey, R.J., Downie, C., Sarjeant, W.A.S. and Williams, G.L., Studies on Mesozoic and Cainozoic dinoflagellate cysts; Bulletin of the British Museum (Natural History) Geology, Supplement 3, p.53-106.

1969: Generic reallocations; *in* Davey, R.J., Downie, C., Sarjeant, W.A.S. and Williams, G.L., Appendix to Studies on Mesozoic and Cainozoic dinoflagellate cysts; Bulletin of the British Museum (Natural History) Geology, Appendix to Supplement 3, p.4-7.

Davies, E.H.

1983: The dinoflagellate Oppel-zonation of the Jurassic-Lower Cretaceous sequences in the Sverdrup Basin, Arctic Canada; Geological Survey of Canada, Bulletin 359, p.1-59, pl.1-10.

De Coninck, J.

1965: Microfossiles planctoniques du Sable yprésien à Merelbeke. Dinophyceae et Acritarcha; Académie royale du Belgique, Classe des Sciences, Mémoires, Coll.8°, no.26-2, p.1-56, pl.1-14.

1969: Dinophyceae et Acritarcha de l'Yprésien du Sondage de Kallo; Institut Royal des Sciences Naturelles de Belgique, Mémoire 161, p.1-67, pl.1-17.

1975: Microfossiles à paroi organique de l'Yprésien du Bassin belge; Service Géologique de Belgique, Prof. Paper no.12, p.1-151, pl.1-22.

1977: Organic walled microfossils from the Eocene of the Woensdrecht borehole, southern Netherlands; Mededelingen Rijks Geologische Dienst, Nieuwe Serie, v.28, p.34-63, pl.1-8.

Deflandre, G.

1933: Note préliminaire sur un péridinien fossile *Lithoperidinium oamaruense* n.g., n. sp; Bulletin de la Société zoologique de France, v.58, p.265-273.

1934: Sur les microfossiles d'origine planctonique, conservés à l'état de matière organique dans les silex de la craie; Comptes rendus de l'Académie des sciences, Paris, v.199, p.966-968.

1935: Considérations biologiques sur les microorganisms d'origine planctonique conservés dans les silex de la craie; Bulletin biologique de la France et de la Belgique, v.69, p.213-244, pl.5-9.

1936a: Les flagellés fossiles. Aperçu biologique et paléontologique. Rôle Géologique; Actualités scientifiques et industrielles, no.335, p.1-97.

1936b: Microfossiles des silex crétacés. Première partie. Généralités. Flagellés; Annales de paléontologie, v.25, p.151-191, pl.1-10.

1937a: *Phanerodinium,* genre nouveau de dinoflagellé fossile des silex; Bulletin de la Société français de Microscopie, v.6, p.109-115.

1937b: Microfossiles des silex crétacés. Deuxième partie. Flagellés *incertae sedis* Hystrichosphaeridés. Sarcodinés. Organisms divers; Annales de paléontologie, v.26, p.51-103, pl.11-18.

1938a: Sur le microplancton des mers jurassiques, conservé à l'état de matière organique dans les marnes des Villers-sur-Mer; Comptes rendus de l'Académie des sciences, Paris, v.206, p.687-689.

1938b: Microplancton des mers jurassiques conservé dans les marnes de Villers-sur-Mer (Calvados). Etude liminaire et considérations générales; Travaux de la Station Zoologique de Wimereux, v.13, p.147-200, pl.5-11.

1939: Sur les dinoflagellés des schistes bitumineux d'Orbagnoux (Jura); Bulletin de la Société française de Microscopie, v.8, p.141-145, pl.6.

1940: Sur un nouveau Péridinien fossile à thèque originellement siliceuse; Comptes rendus de l'Académie des sciences, Paris, v.211, p.265-268.

1941: Le microplancton kiméridgien d'Orbagnoux et l'origine des huiles sulfurées naturelles; Mémoires de l'Académie des sciences, Paris, no.65, p.1-32, pl.1-7.

1943: Sur quelques nouveaux Dinoflagellés des silex crétacés; Bulletin de la Société géologique de France, v.13, p.499-509, pl.17.

1945: Dinoflagellés II. Flagellés *incertae sedis*; Fich. micropaléont. sér.5, Archives Originales Serv. Documentation, Centre National de la Recherche Scientifique, no.235, cards 752-859.

1946a: Hystrichosphaeridés II. Espèces du Secondaire et du Tertiaire; Fich. micropaléont. sér.6; Archives Originales Serv. Documentation, Centre National de la Recherche Scientifique, no.235, cards 860-1019.

1946b: Remarques sur la systématique des Hystrichosphaeridés; Comptes rendus de la Société géologique de France, v.7, p.110-111.

1947a: Sur une nouvelle Hystrichosphère des silex crétacés et sur les affinités du genre *Cannosphaeropsis* O. We.; Comptes rendus de l'Académie des sciences, Paris, v.224, p.1574-1576.

1947b: *Calciodinellum* nov. gen., premier représentant d'une famille nouvelle de dinoflagellés fossiles à thèque calcaire; Comptes rendus de l'Académie des sciences, Paris, v.224, p.1781-1782.

1947c: Sur quelques microorganismes planctoniques des silex Jurassiques; Bulletin de l'Institut océanographique de Monaco, No.921, p.1-10.

1948: Les Calciodinellidés dinoflagellés fossiles à thèque calcaire; Botaniste, v.34, p.191-219.

1954: Systématique des Hystrichosphaeridés: sur l'acception du genre *Cymatiosphaera* O. Wetzel; Comptes rendus de la Société géologique de France, v.12, p.257-258.

1964: Remarques sur la classification des Dinoflagellés fossiles, à propos d'Evittodinium, nouveau genre crétacé de la famille des Deflandreaceae; Comptes rendus de l'Académie des sciences, Paris, v.258, p.5027-5030.

1966: Addendum à mon Mémoire: Microfossiles des silex crétacés; Cahiers de Micropaléontologie, Archives Originales Centre Documentation no.419, sér.1, no.2, p.1-9, pl.1.

1968: *Stenopyxinium* n.g. *grassei* n.sp., nouveau type de kyste de dinoflagellé fossile d'un silex crétacé; Protistologica, v.3 (1967), p.423-426.

Deflandre, G. and Cookson, I.C.
1955: Fossil microplankton from Australian Late Mesozoic and Tertiary sediments; Australian Journal of Marine and Freshwater Research, v.6, p.242-313, pl.1-9.

Deflandre, G. and Courteville, H.
1939: Note préliminaire sur les microfossiles des silex crétacés du Cambrésis; Bulletin de la Société français de Microscopie, v.8, p.95-106, pl.1-3.

Deflandre, G. and Deflandre-Rigaud, M.
1958: Hystrichosphaeridés IV et genres *incertae sedis*. Espèces du Secondaire et du Tertiaire (Supplément 1); Fich. micropaléont. sér.10, Archives Originales Centre Documentation, Centre National de la Recherche Scientifique, no.366, cards 1293-1750.

1966: Dinoflagellés V; Fich. micropaléont. sér. 15, Archives Originales Centre Documentation, Centre National de la Recherche Scientifique, cards 2876-3175.

Deflandre, G. and Foucher, J.C.
1967: *Diacrocanthidium* nov. gen., Diacrodien présumé du crétacé, pourvu d'un archéopyle. Affinités péridiniennes des Diacrodiens; Cahiers de Micropaléontologie, Archives Originales Centre Documentation, Centre National de la Recherche Scientifique, no.439, sér.1-5, p.1-5, pl.1-2.

Deflandre, G. and Sarjeant, W.A.S.
1970: Nouvel examen de quelques holotypes de Dinoflagellés fossiles et d'Acritarches; Cahiers de Micropaléontologie, Archives Originales Centre Documentation, Centre National de la Recherche Scientifique, no.466, sér.2, no.1, p.1-10, pl.1.

Deflandre-Rigaud, M.
1954: Microfossiles des silex sénoniens du Bassin de Paris; Comptes rendus de la Société géologique de France, Somm. no.3, p.58-59.

Deunff, J.
1961: Un microplankton à Hystrichosphères dans le Trémadoc du Sahara; Revue de Micropaléontologie, v.4, p.37-52, pl.1-3.

Diesing, C.M.
1866: Revision der Prothelminthen, Abtheilung: Mastigophoren; S.B. Akad. Wiss. Wien, v.52, p.287-401.

Doben, K.
1973: Kalkflagellaten (*Thoracosphaera* und *Stomiosphaera*) im Mitteltithon von Neuberg an der Donau; Geol. Bavarica, v.67, p.169-171.

Dodekova, L.
1967: Les dinoflagellés et acritarches de l'Oxfordien-Kiméridgien de la Bulgarie du Nord-Est; Annuaire de l'Université de Sofia, Faculté de Géologie et Geographie, v.60, Livre 1, Géologie, 1965-1966, p.9-30, pl.1-3.

1969: Dinoflagellés et acritarches du Tithonique aux environs de Pleven, Bulgarie Central du Nord; Bulgarian Academy of Sciences, Committee of Geology, Bulletin of the Geological Institute, Series Paleontology, v.18, p.13-24, pl.1-5.

1971: Dinoflagelati i acritarchi ot Titona v tsentralni severna Bulgariya; Bulgarian Academy of Sciences, Committee of Geology, Bulletin of the Geological Institute, Series Paleontology, v.20, p.5-22, pl.1-5. (Dinoflagellates and acritarchs of the Tithonian of North-Central Bulgaria).

1974: *Compositosphaeridium* gen. n. - a new genus dinoflagellate cyst; Bulgarian Academy of Sciences, Ministry of Heavy Industry, Bulletin of the Geological Institute, Series Paleontology, v.23, p.25-30, pl.1-2.

1975: New Upper Bathonian dinoflagellate cysts from north-eastern Bulgaria; Bulgarian Academy of Sciences, Palaeontology, Stratigraphy and Lithology, v.2, p.17-34, pl.1-6.

Dörhöfer, G. and Davies, E.H.
1980: Evolution of archeopyle and tabulation in Rhaetogonyaulacinean dinoflagellate cysts; Royal Ontario Museum, Life Sciences Miscellaneous Publications, p.1-91, figs.1-40.

Downie, C.
1957: Microplankton from the Kimeridge Clay; Geological Society of London, Quarterly Journal, v.112, p.413-434, pl.20.

1960: *Deunffia* and *Domasia*, new genera of hystrichospheres; Micropaleontology, v.6, p.197-202, pl.1.

Downie, C., Evitt, W.R. and Sarjeant, W.A.S.
1963: Dinoflagellates, hystrichospheres, and the classification of the acritarchs; Stanford University Publications, Geological Sciences, v.7, p.1-16.

Downie, C. and Sarjeant, W.A.S.
1963: On the interpretation and status of some hystrichosphere genera; Palaeontology, v.6, p.83-96.

1965: Bibliography and index of fossil dinoflagellates and acritarchs; Geological Society of America, Memoir 94, p.1-180 (Dated December, 1964, appeared January, 1965.)

Drugg, W.S.
1964: *Glyphanodinium*, a new dinoflagellate genus from the Paleocene of California; Proceedings Biological Society of Washington, v.77, p.237-240.

1967: Palynology of the Upper Moreno Formation (Late Cretaceous-Paleocene) Escarpado Canyon, California; Palaeontographica, Abt.B, v.120, p.1-71, pl.1-9.

1970a: Two new Neogene species of *Tuberculodinium* and one of *Xenicodinium* (Pyrrhophyta); Proceedings Biological Society of Washington, v.83, p.115-122.

1970b: Some new genera, species, and combinations of phytoplankton from the Lower Tertiary of the Gulf Coast, U.S.A.; North American Paleontological Convention, Chicago, 1969, Proc. G, p.809-843.

1978: Some Jurassic dinoflagellate cysts from England, France and Germany; Palaeontographica, Abt.B, v.168, p.61-79, pl.1-8.

Drugg, W.S. and Loeblich, A.R., Jr.
1967: Some Eocene and Oligocene phytoplankton from the Gulf Coast, U.S.A.; Tulane Studies in Geology, v.5, p.181-194, pl.1-3.

Dufour, T.
1968: Quelques remarques sur les organismes *incertae sedis* de la famille des Calcisphaerulidae Bonet, 1956; Comptes rendus de l'Académie des sciences, Paris, v.266, p.1947-1949.

Dupin, F.
1968: Deux nouvelles espèces de Dinoflagellés du Jurassique d'Aquitaine; Cahiers Micropaléontologie, Archives Originales Centre Documentation, Centre National de la Recherche Scientifique, no.450, sér.1, no.8, p.1-5, pl.1.

Dutta, S.K. and Jain, K.P.
1980: Geology and palynology of the area around Lumshnong, Jaintia Hills, Meghalaya, India; Biological Memoirs, v.5, no.1, p.56-81, pl.1-7.

Duxbury, S.

1977: A palynostratigraphy of the Berriasian to Barremian of the Speeton Clay of Speeton, England; Palaeontographica, Abt.B, v.160, p.17-67, pl.1-15.

1979a: Three new genera of dinoflagellate cysts from the Speeton Clay (Early Cretaceous) of Speeton, England; Micropaleontology, v.25, p.198-205, pl.1-2.

1979b: On *Lagenorhytis* Duxbury nom. nov.; Taxon, v.28, p.587.

1980: Barremian phytoplankton from Speeton, east Yorkshire; Palaeontographica, Abt.B, v.173, p.107-146, pl.1-13.

1983: A study of dinoflagellate cysts and acritarchs from the Lower Greensand (Aptian to Lower Albian) of the Isle of Wight, southern England; Palaeontographica, Abt. B, v.186, p.18-80, pl.1-10.

Eaton, G.L.

1971: A morphogenetic series of dinoflagellate cysts from the Bracklesham Beds of the Isle of Wight, Hampshire, England; *in* Farinacci, A. (ed.), Proceedings Second Planktonic Conference Rome 1970, Edizioni Technoscienza, Rome, v.1, p.355-379, pl.1-4.

1976: Dinoflagellate cysts from the Bracklesham Beds (Eocene) of the Isle of Wight, southern England; Bulletin of the British Museum (Natural History) Geology, v.26, p.227-332, pl.1-21.

Edwards, L.E.

1982: Biostratigraphically important species of *Pentadinium* Gerlach 1961 and a likely ancestor, *Hafniasphaera goodmanii* n. sp., from the Eocene of the Atlantic and Gulf coastal plains; Palynology, v.6, p.105-117, pl.1-4.

1984: Miocene dinocysts from Deep Sea Drilling Project Leg 81, Rockall Plateau, eastern North Atlantic Ocean; *in* Roberts, D.G., Schnitker, *et al,* Initial Reports of the Deep Sea Drilling Project, Volume LXXXI, Washington, p.581-594, pl.1-5.

Edwards, L.E. and Bebout, J.W.

1981: Emendation of *Phthanoperidinium* Drugg & Loeblich 1967, and a description of *P. brooksii* sp. nov. from the Eocene of the Mid-Atlantic outer continental shelf; Palynology, v.5, p.29-41, pl.1-2.

Ehrenberg, C.G.

1832(separate 1830): Beiträge zur Kenntnis der Organisation der Infusorien und ihrer geographischen Verbreitung, besonders in Sibirien; Abhandlungen der Preussischen Akademie der Wissenschaften, 1830, p.1-88, pl.1-8.

1837(separate 1836): Zusätze zur Erkenntnis grosser organischer Ausbildung in den kleinsten thierischen Organismen; Abhandlungen der Preussischen Akademie der Wissenschaften, 1835, p.151-180, pl.1.

1838: Über das Massenverhältniss der jetzt lebenden Kiesel-Infusorien und über ein neues Infusorien-Conglomerat als Polirschiefer von Jastraba in Ungarn; Abhandlungen der Preussischen Akademie der Wissenschaften, 1836, p.109-135, pl.1-2.

1840: Über noch jetzt zahlreich lebende Thierarten der Kreidebildung und den Organismus der Polythalamien; Abhandlungen der Preussischen Akademie der Wissenschaften, 1839, p.81-174, pl.1-4.

1843: Über die Verbreitung des jetzt wirkenden kleinsten organischen Lebens in Asien, Australien und Afrika und über die vorherrschende Bildung auch des Oolithkalkes der Juraformation aus kleinen polythalamischen Thieren; Verhandlungen der Preussischen Akademie der Wissenschaften, Ber, p.100-106.

1854: Mikrogeologie das Erden und Felsenschaffende Wirken des unsichtbaren Kleinen selbständigen Lebens auf der Erde; Leopold Voss, Leipzig, 374 p., Namenregister 31 p., index to atlas 88 p., pl.1-40.

Eisenack, A.

1935: Mikrofossilien aus Doggergeschieben Ostpreussens; Zeitschrift für Geschiebeforschung, v.11, p.167-184, pl.4-5.

1936: *Eodinia pachytheca* n.g., n.sp., ein primitive Dinoflagellat aus einem Kelloway-Geschiebe Ostpreussens; Zeitschrift für Geschiebeforschung, v.12, p.72-75.

1938a: Hystrichosphaerideen und verwandte Formen in baltischen Silur; Zeitschrift für Geschiebeforschung, v.14, p.1-30, pl.1-4.

1938b: Die Phosphoritknollen der Bernsteinformation als Überlieferer tertiären Planktons; Schriften der Physikalischökonomischen Gesellschaft zu Königsberg, v.70, p.181-188.

1954: Mikrofossilien aus Phosphoriten des samländischen Ünteroligozäns und über die Einheitlichkeit der Hystrichosphaerideen; Palaeontographica, Abt.A, v.105, p.49-95, pl.7-12.

1958: Mikroplankton aus dem norddeutschen Apt; Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, v.106, p.383-422, pl.21-27.

1961: Einige Erörterungen über fossile Dinoflagellaten nebst Übersicht über die zur Zeit bekannten Gattungen; Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, v.112, p.281-324, pl.33-37.

1963a: Zur *Membranilarnax*-Frage; Neues Jahrbuch für Geologie und Paläontologie, Monatshefte, p.98-103.

1963b: *Cordosphaeridium* n.g. *ex Hystrichosphaeridium*, Hystrichosphaeridea; Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, v.118, p.260-265, pl.29.

1964: Katalog der fossilen Dinoflagellaten, Hystrichosphären und verwandten Mikrofossilien. Band 1. Dinoflagellaten; E. Schweizerbart'sche Verlangsbuchhandlung, Stuttgart, 1964, 888p., pl.1-9.

1965: Über einige Mikrofossilien des samländischen und norddeutschen Tertiärs; Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, v.123, p.149-159, pl.14-15.

1967: Katalog der fossilen Dinoflagellaten, Hystrichosphaeren und verwandten Mikrofossilien. Band I. Dinoflagellaten. 1. Ergänzungslieferung; E. Schweizerbart'sche Verlagsbuchhandlung, Stuttgart, 1967, 241p.

1969: Kritische Bemerkungen und Richtigstellungen im Gebiet der fossilen Dinoflagellaten und Acritarchen. Critical review of some fossil dinoflagellates and Acritarcha; Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, v.134, p.101-116, pl.18-19.

Eisenack, A. and Cookson, I.C.
1960: Microplankton from Australian Lower Cretaceous sediments; Proceedings of the Royal Society of Victoria, v.72, p.1-11, pl.1-3.

Eisenack, A. and Gocht, H.
1960: Neue Namen für einige Hystrichosphären der Bernsteinformation Ostpreussens; Neues Jahrbuch für Geologie und Paläontologie, Monatshefte, p.511-518.

Eisenack, A. and Kjellström, G.
1971a: Katalog der fossilen Dinoflagellaten, Hystrichosphären und verwandten Mikrofossilien. Band II Dinoflagellaten; E. Schweizerbart'sche Verlagsbuchhandlung, Stuttgart, 1971, 1130 p. , pl.1-6.

1971b: Katalog der fossilen Dinoflagellaten, Hystrichosphären und verwandten Mikrofossilien. Band II Dinoflagellaten. 2. Ergänzungslieferung; E. Schweizerbart'sche Verlagsbuchhandlung, Stuttgart, 1971, 215 p.

Elsik, W.C.
1977: *Paralecaniella indentata* (Defl. and Cooks. 1955) Cookson and Eisenack 1970 and allied dinocysts; Palynology, v.1, p.95-102, pl.1-2.

Engelhardt, D.W.
1976: *Geiselodinium tyonekensis* sp. nov., a dinoflagellate cyst from the nonmarine Tertiary (Miocene) of Alaska; Geoscience and Man, v.15, p.121-124, pl.1.

Erkmen, U. and Sarjeant, W.A.S.
1978: *Xylochoarion,* new genus of dinoflagellate cysts from the Hackness Rock (Middle Jurassic: Callovian) of Yorkshire, England; Neues Jahrbuch für Geologie und Paläontologie, Monatshefte, p.400-407.

1980: Dinoflagellate cysts, acritarchs and tasminitids from the uppermost Callovian of England and Scotland: with a reconsideration of the *"Xanthidium pilosum"* problem; Geobios, no.13, p.45-99, pl.1-8.

Evitt, W.R.

1961a: *Dapcodinium priscum* n. gen., n.sp., a dinoflagellate from the Lower Lias of Denmark; Journal of Paleontology, v.35, p.996-1002, pl.119.

1961b: The dinoflagellate *Nannoceratopsis* Deflandre; morphology, affinities and infraspecific variability; Micropaleontology, v.7, p.305-316, pl.1-2.

1961c: Observations on the morphology of fossil dinoflagellates; Micropaleontology, v.7, p.385-420, pl.1-9.

1962: Dinoflagellate synonyms: *Nannoceratopsis deflandrei* Evitt junior to *N?. gracilis* Alberti; Journal of Paleontology, v.36, p.1129-1130.

1963: A discussion and proposals concerning fossil dinoflagellates, hystrichospheres, and acritarchs, I; Proceedings of the National Academy of Sciences, Washington, v.49, p.158-164.

1974: Restudy of an Oligocene freshwater dinoflagellate from Vermont; Geoscience and Man, v.9, p.1-6, pl.1.

1975: The archeopyle in Cretaceous *Palaeoperidinium eurypylum* (Manum and Cookson) *comb. nov.*, and similar dinoflagellates; Geoscience and Man, v.11, p.77-86, pl.1.

Evitt, W.R., Clarke, R.F.A., and Verdier, J.-P.

1967: Dinoflagellate studies III. *Dinogymnium acuminatum* n. gen., n.sp. (Maastrichtian) and other fossils formerly referable to *Gymnodinium* Stein; Stanford University Publications, Geological Sciences, v.10, p.1-27, pl.1-3.

Fedorova, V.A.

1980: The part of organic microphytoplankton in subsurface correlation (Aptian sediments of North Precaspea); Trudy VNIGRI, UDK [561:581.33]:551.763.12(574.1), p.59-78, pl.1-3.

Fedorova-Shakhmundes, V.A.

1976: Neodiacromorphitae - new subgroup of Cretaceous acritarchs; Trudy VNIGRI, vyp.374, p.90-100, pl.1.

Felix, C.J. and Burbridge, P.P.

1973: A Maastrichtian Age microflora from arctic Canada; Geoscience and Man, v.7, p.1-29, pl.1-4.

Fensome, R.A.

1979: Dinoflagellate cysts and acritarchs from the Middle and Upper Jurassic of Jameson Land, east Greenland; Grønlands Geologiske Undersøgelse, Bulletin 132, p.1-98, pl.1-9.

1981: The Jurassic dinoflagellate genera *Wanaea* and *Energlynia:* their morphology and evolution; Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, v.161, p.47-61.

Fensome, R.A. and Sarjeant, W.A.S.
1982: The dinoflagellate cyst genus *Sarjeantia* Horowitz and its associated microfossils; Grana, v.21, p.51-58.

Fenton, J.P.G.
1981: Taxonomic revision of selected dinoflagellate cysts from the Late Bajocian (Middle Jurassic) of northwest Germany; Review of Palaeobotany and Palynology, v.31, p.249-260, pl.1-3.

Fenton, J.P.G. and Fisher, M.J.
1978: Regional distribution of marine microplankton in the Bajocian and Bathonian of northwest Europe; Palinologia, Numero extraordinario 1, p.233-243.

Fenton, J.P.G., Neves, R., and Piel, K.M.
1980: Dinoflagellate cysts and acritarchs from Upper Bajocian to Middle Bathonian strata of central and southern England; Palaeontology, v.23, p.151-170, pl.14-16.

Filatoff, J.
1975: Jurassic palynology of the Perth Basin, Western Australia; Palaeontographica, Abt. B, v.154, p.1-113, pl.1-30.

Firtion, F.
1952: Le Cénomanien inférieur du Nouvion-en-Thiérache: examen micropaléontologique; Société Géologique du Nord, Ann., v.72, p.150-164, pl.8-10.

Fisher, M.J., and Riley, L.A.
1980: The stratigraphic distribution of dinoflagellate cysts at the boreal Jurassic-Cretaceous boundary; Fourth International Palynology Conference, Lucknow (1976-77) Proceedings, 2, p.313-329, pl.1-4.

1982: A note on the nomenclature of some Upper Jurassic dinoflagellate cyst taxa; Journal of Micropalaeontology, v.1, p.53.

Fisher, M.J., and van Helden, B.G.T.
1979: Some observations on the fossil dinocyst genus *Rhaetogonyaulax* Sarjeant, 1966; Palynology, v.3, p.265-276, pl.1-4.

Fütterer, D.
1976: Kalkige dinoflagellaten ("Calciodinelloideae") und die systematische Stellung der Thoracosphaeroideae; Neues Jahrbuch für Geologie und Paläontologie, Monatshefte, v.9, p.513-524, pl.1-3.

1978: Distribution of calcareous dinoflagellates in Cenozoic sediments of Site 366, eastern North Atlantic; *in* Lancelot, Y., Seibold, E., *et al.*, Initial Reports of the Deep Sea Drilling Project, Volume XLI, Washington, p.709-737, pl.1-9.

1984: Pithonelloid calcareous dinoflagellates from the Upper Cretaceous and Cenozoic of the southeastern Atlantic Ocean; *in* Moore, T.C., Jr., Rabinowitz, P.D. *et al.*, Initial Reports of the Deep Sea Drilling Project, Volume LXXIV, Washington, p.533-541, pl.1-4.

Gaździcka, E.

1978: Calcareous nannoplankton from the uppermost Cretaceous and Paleogene deposits of the Lublin Upland; Acta Geologica Polonica, v.28, no.3, p.335-375.

Gerlach, E.

1961: Mikrofossilien aus dem Oligozän und Miozän Nordwestdeutschlands, unter besonderer Berücksichtigung der Hystrichosphären und Dinoflagellaten; Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, v.112, p.143-228, pl.25-29.

Gilbert, M.W. and Clark, D.L.

1983: Central Arctic Ocean paleooceanographic interpretation based on Late Cenozoic calcareous dinoflagellates; Marine Micropaleontology, v.7, p.385-401.

Gitmez, G.U.

1970: Dinoflagellate cysts and acritarchs from the basal Kimmeridgian (Upper Jurassic) of England, Scotland and France; Bulletin of the British Museum (Natural History) Geology, v.18, p.231-331, pl.1-14.

Gitmez, G.U. and Sarjeant, W.A.S.

1972: Dinoflagellate cysts and acritarchs from the Kimmeridgian (Upper Jurassic) of England, Scotland and France; Bulletin of the British Museum (Natural History) Geology, v.21, p.171-257, pl.1-17.

Gocht, H.

1955: *Rhombodinium* und *Dracodinium* zwei neue Dinoflagellaten-Gattungen aus dem norddeutschen Tertiär; Neues Jahrbuch für Geologie und Paläontologie, Monatshefte, p.84-92.

1956: See Weiler.

1957: Mikroplankton aus dem nordwestdeutschen Neokom (Teil I); Paläontologische Zeitschrift, v.31, p.163-185, pl.18-20.

1959: Mikroplankton aus dem nordwestdeutschen Neokom (Teil II); Paläontologische Zeitschrift, v.33, p.50-89, pl.3-8.

1960: Die Gattung *Chiropteridium* n. gen. (Hystrichosphaeridea) im deutschen Oligozän; Paläontologische Zeitschrift, v.34, p.221-232, pl.17-18.

1964: Planktonische Kleinformen aus dem Lias/Dogger-Grenzbereich Nord- und Süddeutschlands; Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, v.119, p.113-133, pl.15-17.

1968: Zur Morphologie und Ontogenie von *Thalassiphora* (Dinoflagellata); Palaeontographica, Abt. A, v.129, p.149-156, pl.25-27.

1969: Formengemeinschaften alttertiären Mikroplanktons aus Bohrproben des Erdölfeldes Meckelfeld bei Hamburg; Palaeontographica, Abt. B, v.126, p.1-100, pl.1-11.

1970a: Dinoflagellaten-Zysten aus einem Geschiebefeuerstein und ihr Erhaltungszustand; Neues Jahrbuch für Geologie und Paläontologie, Monatshefte, p.129-140.

1970b: Dinoflagellaten-Zysten aus dem Bathonium des Erdölfeldes Aldorf (NW-Deutschland); Palaeontographica, Abt. B, v.129, p.125-165, pl.26-35.

1973: Zur Validitat der Gattung *Palynodinium* Gocht (Dinoflagellata); Neues Jahrbuch für Geologie und Paläontologie, Monatshefte, v.8, p.455- 457.

1975a: Neuuntersuchung von *Eodinia pachytheca* Eisenack, 1936 (Dinoflagellata, Oberjura); Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, v.148, p.12-32.

1975b: Morphologie und Wandstruktur von *Lithodinia jurassica* Eisenack 1935 (Dinoflagellata, Oberjura); Neues Jahrbuch für Geologie und Paläontologie, Monatshefte, p.343-359.

1976: *Hystrichosphaeropsis quasicribrata* (O. Wetzel), ein Dinoflagellat aus dem Maastricht Nordeuropas; Neues Jahrbuch für Geologie und Paläontologie, Monatshefte, p.321-336.

1979: *Eyachia prisca* n.g. n.sp. (Dinoflagellata) aus dem Lias/Dogger-Grenzbereich; Neues Jahrbuch für Geologie und Paläontologie, Monatshefte, p.305-319, Fig.1-10.

Góczán, F.
1962: Mikroplankton a Bakonyi Krétaból (Un microplancton dans le Crétacé de la Montagne Bakony); Á Magyar Állami Földtani Intézet Évi Jelentése, Az 1959. Evröl, p.181 209, pl.1-4.

Goodman, D.K. and Evitt, W.R.
1981: The dinoflagellate *Angustidinium acribes* (Davey and Verdier) gen. et comb. nov. from the mid-Cretaceous of the northern California Coast Ranges; Grana, v.20, p.43-54.

Gorka, H.

1963: Coccolithophoridés, Dinoflagellés, Hystrichosphaeridés et microfossiles incertae sedis du Crétacé supérieur de Pologne; Acta Palaeontologica Polonica, v.8, p.1-83, pl.1-11.

1965: Les microfossiles du Jurassique supérieur de Magnuszew (Pologne); Acta palaeontologica polonica, v.10, p.291-327, pl.1-5.

1970: Dinoflagellate cysts from Callovian of Tukow (Poland); Acta palaeontologica polonica, v.15, p.479-498, pl.1-6.

1982: *Cribroperidinium janinae,* nouvelle espèce de dinoflagellés de L'Hauterivien inférieur de Pologne; Revue de Micropaléontologie, v.25, p.105-110, pl.1-2.

Grigorovich, A.S.

1969a: A new genus *Carpatella* (Dinoflagellata) from Danian-Paleocene deposits of Carpathians; (In Russian). Paleontologicheskii Sbornik (Collection of paleontological papers) no.6, p.74-76.

1969b: Characteristics of some species of dinoflagellata from Cretaceous and Paleogene deposits of the Carpathians; (In Russian). Paleontologicheskii Sbornik (Collection of paleontological papers) no.6, p.67-72, pl.1-2.

1971: Mikrofitoplankton melovykh i paleogenovykh otlozhenii severnogo sklona Ukrainskich Karpat; Byull. Mosk. Obshch. Ispuyt. Prirody, Otdel Geol., v.46, p.83-93, pl.1-3.

1972: Peridinei iz Pogranichnykh Sloev Paleogena i Neogena Prichernomorskoi Vpadiny; Paleontologicheskii Sbornik (Collection of paleontological papers), no.9, p.64-70, 1pl.

Gruas-Cavagnetto, C.

1968: Etude palynologique des divers gisements du Sparnacien du bassin de Paris; Mémoires de la Société géologique de France (N.S.), v.47, no.110, p.1-144, pl.1-18.

Habib, D.

1969: Middle Cretaceous palynomorphs in a deep-sea core from the Seismic Reflector Horizon A outcrop area; Micropaleontology, v.15, p.85-101, pl.1-4.

1970: Middle Cretaceous palynomorph assemblages from clays near the Horizon Beta deep-sea outcrop; Micropaleontology, v.16, p.345-379, pl.1-10.

1972: Dinoflagellate stratigraphy Leg 11, Deep Sea Drilling Project; *in* Hollister, C.D., Ewing, J.I., *et al.,* Initial Reports of the Deep Sea Drilling Project, Volume XI, Washington, p.367-425, pl.1-22.

1973: Taxonomy, morphology and suggested phylogeny of the dinoflagellate genus *Druggidium;* Geoscience and Man, v.7, p.47-55, pl.1-3.

1976: Neocomian dinoflagellate zonation in the western North Atlantic; Micropaleontology, v.21, p.373-392, pl.1-3.

Habib, D. and Drugg, W.S.
1983: Dinoflagellate age of Middle Jurassic-Early Cretaceous sediments in the Blake-Bahama Basin; *in* Sheridan, R.E., Gradstein, F.M. *et al.*, 1983, Initial Reports of the Deep Sea Drilling Project, Volume LXXVI, Washington, p.623-638, pl.1-3.

Hansen, J.M.
1977: Dinoflagellate stratigraphy and echinoid distribution in Upper Maastrichtian and Danian deposits from Denmark; Geological Society of Denmark, Bulletin, v.26, p.1-26, Fig.1-22.

Haq, B.U.
1978: Calcareous nannoplankton; *in* Haq, B.U. and Boersma, A. (eds.), Introduction to Marine Micropaleontology; Elsevier, New York, p.79-107.

Haq, B.U. and Lohman, G.P.
1976: Early Cenozoic calcareous nannoplankton biogeography of the Atlantic Ocean; Marine Micropaleontology, v.1, p.119-194, pl.1-14.

Harker, S.D. and Sarjeant, W.A.S.
1975: The stratigraphic distribution of organic-walled dinoflagellate cysts in the Cretaceous and Tertiary; Review of Palaeobotany and Palynology, v.20, p.217-315, pl.1.

Harland, R.
1968: A microplankton assemblage from the post-Pleistocene of Wales; Grana Palynologica, v.8, p.536-554.

1973: Dinoflagellate cysts and acritarchs from the Bearpaw Formation (Upper Campanian) of southern Alberta, Canada; Palaeontology, v.16, p.665-706, pl.84-88.

1977a: Dinoflagellate cysts from the Bearpaw Formation (?Upper Campanian to Maastrichtian) of Montana; Palaeontology, v.20, p.179-193, pl.25.

1977b: Recent and Late Quaternary (Flandrian and Devensian) dinoflagellate cysts from marine continental shelf sediments around the British Isles; Palaeontographica, Abt. B, v.164, p.87-126, pl.1-4.

1979a: *Ageraspharea* nov. gen., an *'Eisenackia'* like dinoflagellate cyst from the Thanet Sands (Paleocene) of southeast England; Review of Palaeobotany and Palynology, v.28, p.27-35, pl.1-2.

1979b: Dinoflagellate biostratigraphy of Neogene and Quaternary sediments at holes 400/400A in the Bay of Biscay (Deep Sea Drilling Project Leg 48); *in* Montadert, L., Roberts, D.G., *et al.*, Initial Reports of the Deep Sea Drilling Project, Volume XLVIII, Washington, p.531-545, pl.1-3.

1979c: The *Wetzeliella (Apectodinium) homomorphum* plexus from the Palaeogene/earliest Eocene of northwest Europe; Fourth International Palynology Conference, Lucknow (1976-1977), Proceedings, 2, p.59-70, pl.1-2.

1981: Cysts of the colonian dinoflagellate *Polykrikos schwartzii* Bütschli 1873, (Gymnodiniales), from Recent sediments, Firth of Forth, Scotland; Palynology, v.5, p.65-79, pl.1-3.

1982a: A review of Recent and Quaternary organic-walled dinoflagellate cysts of the genus *Protoperidinium;* Palaeontology, v.25, p.369-397, pl.38-42.

1982b: Recent dinoflagellate cyst assemblages from the southern Barents Sea; Palynology, v.6, p.9-18, pl.1-2.

Harland, R. and Hill, J.
1979: A reappraisal of the Cainozoic dinoflagellate cyst *"Hystrichosphaeridium" choanophorum* Deflandre et Cookson 1955; Review of Palaeobotany and Palynology, v.28, p.37-45, pl.1-2.

Harland, R., Morbey, S.J. and Sarjeant, W.A.S.
1975: A revision of the Triassic to lowest Jurassic dinoflagellate *Rhaetogonyaulax;* Palaeontology, v.18, p.847-864, pl.100-104.

Harland, R., Reid, P.C., Dobell, P. and Norris, G.
1980: Recent and sub-Recent dinoflagellate cysts from the Beaufort Sea, Canadian Arctic; Grana, v.19, p.211-225.

Harland, R. and Sarjeant, W.A.S.
1970: Fossil freshwater microplankton (dinoflagellates and acritarchs) from Flandrian (Holocene) sediments of Victoria and Western Australia; Proceedings of the Royal Society of Victoria, v.83, p.211-234, pl.21-22.

Harland, R. and Sharp, J.
1980: *Phthanoperidinium obscurum* sp. nov., a non-marine dinoflagellate cyst from the late Eocene of England; Review of Palaeobotany and Palynology, v.30, p.287-296, pl.1-2.

Harris, W.K.
1965: Basal Tertiary microfloras from the Princetown Area, Victoria, Australia; Palaeontographica, Abt. B, v.115, p.75-106.

1974: Tertiary nonmarine dinoflagellate cyst assemblages from Australia; Special Publications of the Geological Society of Australia, no.4, p.159-166, pl.1-2.

He Cheng-quan.
1980: Some new genera of Oligocene dinoflagellates and acritarchs from the coastal region of Beibu Wan, China; National Institute of Geology and Paleontology, Academia Sinica, p.1-11, pl.1

1984a: Some new genera of Late Cretaceous to Eocene Microphytoplankton from Western Tarim Basin in southern Xinjiang; Acta Palaeontologica Sinica, v.23, no.6, p.768-774, pl.1.

1984b: Tertiary dinoflagellates and acritarchs from the coastal region of the Beibu Gulf; Memoirs of Nanjing Institute of Geology and Palaeontology, Academia Sinica, no.19, p.143-192, pl.1-12.

He Cheng-quan and Li Peng.
1981: Late Late Oligocene dinoflagellates and acritarchs from North Continental Shelf of South China Sea; *in* Tertiary Palaeontology of North Continental Shelf of South China Sea, p.60-72, pl.31-35.

He Cheng-quan and Qian Ze-shu.
1979: Early Tertiary dinoflagellates and acritarchs from the Bose Basin of Guangxi; Acta Palaeontologica Sinica, v.18, no.3, p.171-188, pl.1-2.

Heisecke, A.M.
1970: Microplancton de la Formación Roca de la Provincia de Neuquén; Ameghiniana, v.7, p.225-262, pl.1-12.

Helenes, J.
1983: Evaluation of Jurassic-Cretaceous dinoflagellates in the *Ascodinium-Ovoidinium* complex; Micropaleontology, v.29, no.3, p.255-266, pl.1.

1984: Morphological analysis of Mesozoic-Cenozoic *Cribroperidinium* (Dinophyceae), and taxonomic implications; Palynology, v.8, p.107-137, pl.1-5.

Herngreen, G.F.W.
1975: Palynology of Middle and Upper Cretaceous strata in Brazil; Mededelingen Rijks Geologischen Dienst., Nieuwe Series, v.26, p.39-91, pl.1-5.

Herngreen, G.F.W., De Boer, K.F., Romein, B.J., Lissenberg, Th. and Wijker, N.C.
1984: Middle Callovian beds in the Achterhoek, eastern Netherlands; Mededelingen Rijks Geologische Dienst, v.37, p.1-29, pl.1-6.

Horowitz, A.
1970: Jurassic microflora from the northern Negev, Israel; Israel Journal of Earth Sciences, v.19, p.153-182, pl.1-5.

1975: Kystes de Dinoflagellés du Trias du Sud d'Israel; Revue de Micropaléontologie, v.18, p.23-27, pl.1.

Ioannides, N.S., Stavrinos, G.N. and Downie, C.
1977: Kimmeridgian microplankton from Clavel's Hard, Dorset, England; Micropaleontology, v.22, p.443-478.

Islam, M.A.
1982: Archeopyle structure in the fossil dinoflagellate *Phthanoperidinium*; Review of Paleobotany and Palynology; v.36, p.305-316, pl.1-2.

1983a: Dinoflagellate cysts from the Eocene cliff sections of the Isle of Sheppey, southeast England; Revue de Micropaléontologie, v.25, p.231-250, pl.1-4.

1983b: Dinoflagellate cyst taxonomy and biostratigraphy of the Eocene Bracklesham Group in southern England; Micropaleontology, v.29, p.328-353, pl.1-4.

1983c: Dinoflagellate cysts from the Eocene of the London and Hampshire basins, southern England; Palynology, v.7, p.71-92, pl.1-4.

Jafar, S.A.
1979: Taxonomy, stratigraphy and affinities of calcareous nannoplankton genus *Thoracosphaera* Kamptner; Proceedings of the IV International Palynological Conference, Lucknow, v.2, p.1-21, pl.1-6.

Jain, K.P.
1977: Additional dinoflagellates and acritarchs from Grey Shale Member of Dalmiapuram Formation, south India; Palaeobotanist, v.24, p.170-194, pl.1-6.

1978: An Upper Cretaceous dinoflagellate assemblage from Vriddhachalam area, Cauvery Basin, south India; Palaeobotanist, v.25, p.146-160, pl.1-3.

1980: Reallocation of some dinoflagellate cysts from the Kutch, western India; Journal of the Palaeontological Society of India, v.23-24, p.140-143, pl.1-2.

1982: Cenozoic dinoflagellate cysts and acritarchs from sedimentary formations of India: a critical review; Special Publication of the Palaeontological Society of India, no.1, p.50-56.

Jain, K.P. and Garg, R.
1982: Revision of some dinoflagellate cysts from Meghalaya, India; Journal of the Palaeontological Society of India, v.27, p.68-70.

1983: *Cleistosphaeridium mikiril* Mehrotra, a junior synonym of *Lingulodinium machaerophorum* (Deflandre and Cookson) Wall, 1967; Journal of the Palaeontological Society of India, v.28, p.61-62.

Jain, K.P., Kumar, P. and Maheshwari, H.K.
1982: Dinoflagellate cysts from "non-marine" sediments of Jabalpur Group at Morghat, Madhya Pradesh; Palaeobotanist, v.30, no.1, p.22-27, pl.1.

Jain, K.P. and Millepied, P.
1973: Cretaceous microplankton from Senegal Basin, N. W. Africa. 1. Some new genera species and combinations of dinoflagellates; Palaeobotanist, v.20, p.22-32, pl.1-3.

1975: Cretaceous microplankton from Senegal Basin, W. Africa, Pt.II. Systematics and biostratigraphy; Geophytology, v.5, p.126-171.

1977: Two new names: *Fromea senegalensis* and *Pterospermopsis kiesseri;* Geophytology, v.7, p.284.

Jain, K.P., Sah, S.C.D. and Singh, R.Y.
1975: Fossil dinoflagellates across Maestrichtian-Danian boundary in Lower Assam, India; Palaeobotanist, v.22, p.1-18, pl.1-7.

Jain, K.P. and Tandon, K.K.
1981: Dinoflagellate and acritarch biostratigraphy of the Middle Eocene rocks of a part of South-Western Kachchh, India; Journal of the Palaeontological Society of India, v.26, p.6-21, pl.1-4.

Jain, K.P. and Taugourdeau-Lantz, J.
1973: Palynology of Dalmiapuram grey shale, Dalmiapuram Formation, District Trichinopoly, south India - 1. Taxonomy; Geophytology, v.3, p.52-68, pl.1-4.

Jan du Chêne, R.
1977: Etude palynologique du Miocene supérieur Andalou (Espagne); Revista Espanola de Micropaleontologia, v.9, p.97-114, pl.1-2.

Jan Du Chêne, R.J. and Châteauneuf, J.-J.
1975: Nouvelles espèces de *Wetzeliella* et *Deflandrea* (Pyrrhophyta, Dinophyceae) de l'Eocène des Alpes occidentales; Revue de Micropaléontologie, v.18, p.28-37, pl.1-3.

Jiabo
1978: On the Paleogene dinoflagellates and acritarchs from the coastal region of Bohai; Nanking Institute of Geology and Palaeontology, Academia Sinica, p.1-190, pl.1-49.

Johnson, C.D. and Hills, L.V.
1973: Microplankton zones of the Savik Formation (Jurassic), Axel Heiberg and Ellesmere Islands, District of Franklin; Bulletin of Canadian Petroleum Geology, v.21, p.178-218, pl.1-3.

Kälin, O. and Bernoulli, D.
1984: *Schizosphaerella* Deflandre and Dangeard in Jurassic deeper-water carbonate sediments, Mazagan continental margin (Hole 547B) and Mesozoic Tethys; *in* Hinz, K, Winterer, E.L., *et al.*, Initial Reports of the Deep Sea Drilling Project, Volume LXXIX, Washington, p.411-435.

Kamptner, E.
1927: Beitrag zur Kenntnis adriatischer Coccolithophoriden; Archiv für Protistenkunde, v.58, p.173-184, text-fig.1-6.

1928: Uber das System und die Phylogenie der Kalkflagellaten; Archiv für Protistenkunde, v.64, p.19-43.

1944: Coccolithineen-Studien in Golf von Neapel; Wiener botanische Zeitschrift, v.93, p.138-147.

1955: Fossile Coccolithineen-Skelettreste aus Insulinde; Verhandelingen der Koninklijke Nederlandsche Akademie van Wetenschappen, Afdeeling Natuurkunde, Tweede Reeks, v.50, p.1-106.

1956: *Thoracosphaera deflandrei* nov. spec., ein bemerkenswertes Kalkflagellaten-Gehäuse aus dem Eocän von Donzacq (Dep. Landes, Frankreich); Österreichische botanische Zeitschrift, v.103, p.448-456.

1958: Betrachtungen zur Systematik der Kalkflagellaten; Archiv für Protistenkunde, v.103, p.54-116.

1963: Coccolithineen-Skelettreste aus Tiefseeablagerungen des Pazifischen Ozeans; Annalen des Naturhistorischen Museums, Wien, v.66, p.139-204.

1967: Kalkflagellaten-Skelettreste aus dem Tiefseeschlamm des Südatlantischen Ozeans; Annalen des Naturhistorischen Museums, Wien, v.71, p.117-198.

Kar, R.K.
1979: Palynological fossils from the Oligocene sediments and their biostratigraphy in the District of Kutch, western India; Palaeobotanist, v.26, p.6-49, pl.1-4.

Kar, R.K., Singh, R.Y. and Sah, S.C.D.
1972: On some algal and fungal remains from Tura Formation of Garo Hills, Assam; Palaeobotanist, v.19, p.146-154, pl.1-2.

Keupp, H.
1977: Ultrafazies und Genese der Solnhofener Plattenkalke (Oberer Malm, Südliche Frankenalb); Abhandlungen der Naturhistorischen Gesellschaft Nürnberg, v.37, p.1-128, pl.1-30.

1978: Calcisphaeren des Untertithon der Südlichen Frankenalb und die systematische Stellung von *Pithonella* Lorenz 1901; Neues Jahrbuch für Geologie und Paläontologie, Monatshefte, p.87-98.

1979a: Calciodinelloidea aus der Blätterton-Fazies des nordwest-deutschen Unter-Barremium; Bericht der Naturhistorischen Gesellschaft Hannover, v.122, p.7-69, pl.1-11.

1979b: *Alasphaera caudata* n.g. n.sp., eine neue Calciodinelloidee aus der Unterkreide (Hauterivium) Nordwest-deutschlands; Neues Jahrbuch für Geologie und Paläontologie, Monatshefte, p.284-290.

1979c: Lower Cretaceous Calcisphaerulidae and their relationship to calcareous dinoflagellate cysts; Bulletin Centre Recherches Explor. Prod. Elf-Aquitaine, v.3, p.651-663, pl. 1-6.

1980a: *Calcigonellum* Deflandre, 1948 und *Echinodinella* n. gen. (Kalkige Dinoflagellaten-Zysten) aus der nordwestdeutschen Unter-Kreide; Facies, v.2, p.123-148, pl.14-17.

1980b: *Pithonella paratabulata* n.sp., eine unterkretazische Calcisphaere mit äusserer Paratabulation; Facies, v.3, p.239-249, pl.30-31.

1980c: *Pithonella patriciagreeleyae* Bolli, 1974, eine kalkige Dinoflagellaten-zyste mit interner Paratabulation (Unter-Kreide, Speeton/SE-England): Neues Jahrbuch für Geologie und Paläontologie, Monatshefte, v.9, p.513-524, pl.1-3.

1981: Die kalkigen Dinoflagellaten-Zysten der borealen Unter-Kreide (Unter-Hauterivium bis Unter-Albium); Facies, v.5, p.1-190, pl.1-53.

1982: Die Kalkigen Dinoflagellaten-Zysten des späten Apt und frühen Alb in Nordwestdeutschland; Geologische Jahresberichte, Hannover, v.A65, p.307-363, pl.1-9.

1984: Revision der kalkigen Dinoflagellaten-Zysten G. Deflandre, 1948; Paläontologische Zeitschrift, v.58, p.9-31, pl.1-11.

Keupp, H. and Michael, E.
1979: Calciodinelloidea aus der Blätterton-Fazies des Nordwestdeutschen Unter-Barremium; Bericht der Naturhistorischen Gesellschaft Hannover, v.122, p.7-69, pl.1-11.

Keupp, H. and Mutterlose, J.
1984: Organismenverteilung in den D-Beds von Speeton (Unter-Kreide, England) unter besonderer Berücksichtigung der kalkigen Dinoflagellaten-Zysten; Facies, v.10, p.153-178, pl.20-23.

Khanna, A.K. and Singh, H.P.
1980: *Subathua* - a new dinoflagellate genus and its palaeoecological significance in the Subathu Formation, Simla Hills; Palaeobotanist, v.26, p.307-313, pl.1.

Kimyai, A.
1966: New plant microfossils from the Raritan Formation (Cretaceous) in New Jersey; Micropaleontology, v.12, p.461-476, pl.1-2.

Kjellström, G.
1972: Archaeopyle formation in the genus *Lejeunia* Gerlach, 1961 emend; Geologiska Föreningens i Stockholm Förhandlingar, v.94, p.467-469.

1973: Maastrichtian microplankton from the Höllviken Borehole no.1 in Scania, southern Sweden; Sveriges Geologiska Undersökning, Afhandlingar och Uppsatser, v.67, p.1-59.

Klement, K.W.
1957: Revision der Gattungszugehörigkeit einiger in die Gattung *Gymnodinium* Stein eingestufter Arten jurassischer Dinoflagellaten; Neues Jahrbuch für Geologie und Paläontologie, Monatshefte, p.408-410.

1960: Dinoflagellaten und Hystrichosphaerideen aus dem unteren und mittleren Malm Südwestdeutschlands; Palaeontographica, Abt A, v.114, p.1-104, pl.1-10.

1961: Kritische Stellungnahme zur Gattung *Bulbodinium* O. Wetzel 1960 (Dinoflagellaten); Neues Jahrbuch für Geologie und Paläontologie, Monatshefte, p.489-492.

Klumpp, B.
1953: Beitrag zur Kenntnis der Mikrofossilien des mittleren und oberen Eozän; Palaeontographica, Abt.A, v.103, p.377-406, pl.16-20.

Kobayashi, S. and Matsuoka, K.
1984: Cyst and theca form of *Protoperidinium conicum;* The Japanese Journal of Phycology, v.32, no.3, p.251-256.

Kofoid, C.A.
1911: Dinoflagellata of the San Diego region, IV. The genus *Gonyaulax,* with notes on its skeletal morphology and a discussion of its generic and specific characters; University of California Publications in Zoology, v.8, p.187-286, pl.9-17.

Krasheninnikov, V.A. and Basov, I.A.
1983: Cretaceous calasphaerulids of the Falkland Plateau, D.S.D.P. Leg 71; *in* Ludwig, W.J., Krasheninnikov, V.A., *et al.;* Initial Reports of the Deep Sea Drilling Project, Volume LXXI, Washington, p.977-997.

Krutzsch, W.
1962: Die Mikroflora der Geiseltalbraunkohle. Teil III. Süsswasserdinoflagellaten aus subaquatisch gebildeten Blätterkohlenlagen des mittleren Geiseltales; Hallesches Jahrbuch für mitteldeutsche Erdgeschichte, v. 4, p.40-45, pl.10-11.

Kufferath, H.
1950: Recherches sur le plancton de la mer flamande (mer du Nord méridionale). 1. Quelques flagellés, protistes et "caetera"; Institute Royal des Sciences Naturelles de Belgique, Bulletin, v.26, p.1-43.

Lange, D.
1969: Mikroplankton aus dem Fischton von Stevns-Klint auf Seeland; Beiträge zur Meereskunde, Heft 24-25, p.110-121, pl.1-3.

Lefevre, M.
1933a: Recherches sur les Péridiniens fossiles des Barbades; Bull. Mus. Hist. nat. Paris, ser.2, v.5, p.415-418.

1933b: Les Péridinites des Barbades; Annales de cryptogamie exotique, v.6, p.215-229.

Leffingwell, H.A. and Morgan, R.P.
1977: Restudy and comparison of the dinoflagellate cyst genus *Carpodinium* to that of *Prionodinium* n.gen.; Journal of Paleontology, v.51, p.288-302, pl.1-4.

Lejeune-Carpentier, M.
1938: L'étude microscopique des silex. *Areoligera:* nouveau genre d'Hystrichosphaeridée (Sixième note); Annales de la Société géologique de Belgique, v.62, p.B163-B174.

1939: L'étude microscopique des silex. Un nouveau Péridinien crétacique: *Gonyaulax wetzeli* (Septième note); Annales de la Société géologique de Belgique, v.62, p.B525-B529.

1940: L'étude microscopique des silex. Systématique et morphologie des "Tubifères" (Huitième note); Annales de la Société géologique de Belgique, v.63, p.B216-B236.

1941: L'étude microscopique des silex. Sur *Hystrichosphaeridium hirsutum* (Ehrenberg) et quelques formes voisines (Neuvième note); Annales de la Société géologique de Belgique, v.63, p.B71-B92.

1942: L'étude microscopique des silex. Péridiniens nouveaux ou peu connus (Dixième note); Annales de la Société géologique de Belgique, v.65, p.B181-B192.

1946: L'étude microscopique des silex. Espèces nouvelles ou douteuses de *Gonyaulax*. (Douzième note); Annales de la Société géologique de Belgique, v.69, p.B187-B197.

1951: L'étude microscopique des silex. *Gymnodinium* et *Phanerodinium* (Dinoflagellates) de Belgique (Treizième note); Annales de la Société géologique de Belgique, v.74, p.B307-B315.

Lejeune-Carpentier, M. and Sarjeant, W.A.S.
1981: Restudy of some larger dinoflagellate cysts and an acritarch from the Upper Cretaceous of Belgium and Germany; Annales de la Société Géologique de Belgique, v.104, p.1-39, pl.1-6.

1983: Restudy of some smaller dinoflagellate cysts from the Upper Cretaceous of Belgium; Annales de la Société Géologique de Belgique, v.106, p.1-17, pl.1-2.

Lentin, J.K.
1983: *Williamsidinium banksianum* gen. et sp. nov., a new peridinioid dinoflagellate cyst from the Maastrichtian of Banks Island, N.W.T., Canada; Palynology, v.7, p.147-151, pl.1.

Lentin, J.K. and Williams, G.L.
1973: Fossil dinoflagellates: index to genera and species; Geological Survey of Canada, Paper no.73-42, p.1-176.

1975: Fossil dinoflagellates: index to genera and species. Supplement 1; Canadian Journal of Botany, v.53, p.2147-2157.

1976: A monograph of fossil peridinioid dinoflagellate cysts; Bedford Institute of Oceanography, Report Series BI-R-75-16, p.1-237.

1977a: Fossil dinoflagellate genus *Isabelidinium nom. nov.;* Palynology, v.1, p.167-168.

1977b: Fossil dinoflagellates: index to genera and species, 1977 edition; Bedford Institute of Oceanography, Report Series Bl-R-77-8, p.1-209.

1980: Dinoflagellate provincialism with emphasis on Campanian peridiniaceans; American Association of Stratigraphic Palynologists, Contributions Series, no.7, p.1-47, pl.1.

1981: Fossil dinoflagellates: index to genera and species, 1981 edition; Bedford Institute of Oceanography, Report Series BI-R-81-12, p.1-345.

Lewis, J., Dodge, J.D. and Tett, P.
1984: Cyst-theca relationships in some *Protoperidinium* species (Peridiniales) from Scottish sea lochs; Journal of Micropalaeontology, v.3, no.2, p.25-34, pl.1.

Liengjarern, M., Costa, L. and Downie, C.
1980: Dinoflagellate cysts from the Upper Eocene-Lower Oligocene of the Isle of Wight; Palaeontology, v.23, p.475-499, pl.53-54.

Lister, T.R.
1970: The acritarchs and chitinozoa from the Wenlock and Ludlow Series of the Ludlow and Millichope areas, Shropshire; Palaeontographical Society Monograph, v.124, p.1-100, pl.1-13.

Loeblich, A.R. Jr. and Loeblich, A.R. III
1966: Index to the genera, subgenera, and sections of the Pyrrhophyta; Studies in Tropical Oceanography, Miami, no.3, x + 94p, pl.1.

1968: Index to the genera, subgenera, and sections of the Pyrrhophyta, II; Journal of Paleontology, v.42, p.210-213.

1969: Index to the genera, subgenera, and sections of the Pyrrhophyta, III; Journal of Paleontology, v.43, p.193-198.

1970: Index to the genera, subgenera, and sections of the Pyrrhophyta; Phycologia, v.9, p.199-203.

1971: Index to the genera, subgenera, and sections of the Pyrrhophyta, VI; Phycologia, v.10, p.309-314.

Loeblich, A.R. Jr. and Tappan, H.
1977: *Senegalinium* Jain and Millepied, 1973, correct name for *Alterbia* Lentin and Williams, 1975, a dinoflagellate; Micropaleontology, v.23, p.368.

Lohmann, H.
1920: Die Bevölkerung des Ozeans mit Plankton nach den Ergebnissen der Zentrifugenfänge während der Ausreise der Deutschland 1911, zugleich ein Beitrag zur Biologie des Atlantischen Ozeans; Archiv für Biontologie, v.4, p.1-617.

Lorenz, T.
1901: Geologische Studien im Grenzgebiete zwischen helvetischer und ostalpiner Fazies; Bericht der Naturforschenden Gesellschaft zu Freiburg, v.12, p.34-95.

Lucas-Clark, J.
1984: Morphology of species of *Litosphaeridium* (Cretaceous, Dinophyceae); Palynology, v.8, p.165-193, pl.1-5.

Mackö, S.
1957: Lower Miocene pollen flora from the valley of Keodnicka near Gliwice (Upper Silesia); Prace Wroclawskiego Towarzystwa Naukowego, ser.13, no.88, p.1-313, pl.1-80.

Maier, D.
1959: Planktonuntersuchungen in tertiären und quartären marinen Sedimenten. Ein Beitrag zur Systematik, Stratigraphie und Ökologie der Coccolithophorideen, Dinoflagellaten und Hystrichosphaerideen vom Oligozän bis zum Pleistozän; Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, v.107, p.278-340, pl.27-33.

Maliavkina, V.S.
1961: *in* Samoilovich, S.R. and Mtchedlishvili, N.D. (eds.) 1961: Pyl'tsa i spory zapadnoy Sibiri, Yura-Paleotsen; Trudy VNIGRI, v.177, 659p. (Pollen and spores of Western Siberia, Jurassic-Paleocene).

Malloy, R.E.
1972: An Upper Cretaceous dinoflagellate cyst lineage from Gabon, West Africa; Geoscience and Man, v.4, p.57-65, pl.1.

Mantell, G.A.
1844: The medals of Creation; or, First Lessons in Geology and the Study of Organic Remains; Henry G. Bohn, London, 2 vols. 1016p., pl.1-8.

1850: A pictorial atlas of fossil remains consisting of coloured illustrations selected from Parkinson's "Organic remains of a former world", and Artis's "Antediluvian phytology"; Henry G. Bohn, London. xii + 207p., 74pl.

1854: The medals of Creation; or, first lessons in Geology and the study of organic remains; Second edition, Henry G. Bohn, 2 vols., 930p., pl.1-6.

Manum, S.

1960: Some dinoflagellates and hystrichosphaerids from the Lower Tertiary of Spitsbergen; Nytt Magasin for Botanikk, v.8, p.17-26, pl.1.

1963: Some new species of *Deflandrea* and their probable affinity with *Peridinium;* Norsk Polarinstitutt, Årbok 1962, p.55-67, pl.1-3.

1979: Two new Tertiary dinocyst genera from the Norwegian Sea: *Lophocysta* and *Evittosphaerula;* Review of Palaeobotany and Palynology, v.28, p.237-248, pl.1-2.

Manum, S. and Cookson, I.C.

1964: Cretaceous microplankton in a sample from Graham Island, Arctic Canada, collected during the second "Fram"-Expedition (1898-1902). With notes on microplankton from the Hassel Formation, Ellef Ringnes Island; Schrifter utgitt av Det Norske Videnskaps-Akademi i Oslo, I. Mat-Naturv. Klasse, Ny Series 17, p.1-35, pl.1-7.

Marszalek, D.S.

1975: Calcisphere ultrastructure and skeletal aragonite from the alga *Acetabularia antillana;* Journal of Sedimentary Petrology, v.45, p.266-271.

Masters, B.A. and Scott, R.W.

1978: Microstructure, affinities and systematics of Cretaceous calcispheres; Micropaleontology, v.24, p.210-221, pl.1-2.

Matsuoka, K.

1974: Some plant microfossils from the Miocene Fujiwara Group, Nara, central Japan; Transactions and Proceedings of the Palaeontological Society of Japan, v.94, p.319-340, pl.44-46.

1976: Paleoenvironmental study of the Saho and the Saidaiji Formations from a view point of palynology; Mizunami Fossil Museum, Bulletin 3, p.99-117, pl.25-30.

1979: *Hystrichokolpoma* from Pleistocene sediments in Okinawa-Jima, Japan; Review of Palaeobotany and Palynology, v.28, p.47-60, pl.1-2.

1981: Dinoflagellate cysts and pollen in pelagic sediments of the northern part of the Philippine Sea; Bulletin of the Faculty of Liberal Arts, Nagasaki University, Natural Science, v.21, no.2, p.59-70, pl.1-2.

1983a: List of synonyms of late Pleistocene to Holocene dinoflagellate cysts. I *Gonyaulax* group.

1983b: Late Cenozoic dinoflagellates and acritarchs in the Niigata District, central Japan; Palaeontographica, Abt. B, v.187, p.89-154, pl.1-15.

1983c: A new dinoflagellate cyst (*Danea heterospinosa)* from the Eocene of central Java, Indonesia; Review of Palaeobotany and Palnology, v.40, p.115-126, pl.1-2.

1984a: Some dinoflagellate cysts from the Nanggulan Formation in central Java, Indonesia; Transactions and Proceedings of the Palaeontology Society of Japan, N.S., no.134, p.374-387, pl.71-74.

1984b: List of synonyms of late Pleistocene-to-Holocene dinoflagellate cysts II. *Peridinium* and *Gymnodinium* groups; News of Osaka Micropaleontologists (NOM), no.12, p.1-15.

May, F.E.

1977: Functional morphology, paleoecology, and systematics of *Dinogymnium* tests; Palynology, v.1, p.103-121, pl.1-3.

1980: Dinoflagellate cysts of the Gymnodiniaceae, Peridiniaceae, and Gonyaulacaceae from the Upper Cretaceous Monmouth Group, Atlantic Highlands, New Jersey; Palaeontographica, Abt.B., v.172, p.10-116, pl.1-23.

Mayr, E.

1969: Principles of systematic zoology; McGraw-Hill, New York. 428p.

McIntyre, D.J.

1975: Morphologic changes in *Deflandrea* from a Campanian section, District of Mackenzie, N.W.T., Canada; Geoscience and Man, v.11, p.61-76, pl.1-4.

McIntyre, D.J. and Brideaux, W.W.

1980: Valanginian miospore and microplankton assemblages from the northern Richardson Mountains, District of Mackenzie, Canada; Geological Survey of Canada, Bulletin 320, p.1-57, pl.1-12.

McLean, D.M.

1971: Transfer of *Baltisphaeridium septatum* Cookson and Eisenack, 1967, from the Acritarcha to the Dinophyceae; Journal of Paleontology, v.45, p.729-730, pl.88.

1972: *Cladopyxidium septatum*, n. gen., n. sp., possible Tertiary ancestor of the modern dinoflagellate *Cladopyxis hemibrachiata* Balech, 1964; Journal of Paleontology, v.46, p.861-863, pl.1.

1973a: Emendation and transfer of *Eisenackia* (Pyrrhophyta) from the Microdiniaceae to the Gonyaulacaceae; Geologiska Föreningens i Stockholm Förhandlingar, v.95, p.261-265.

1973b: A problematical dinoflagellate from the Tertiary of Virginia and Maryland; Palaeontology, v.16, p.729-732, pl.90.

1974: Two new Paleocene dinoflagellates from Virginia and Maryland; Palaeontology, v.17, p.65-70, pl.8.

1976: *Eocladopyxis peniculatum* Morgenroth, 1966, Early Tertiary ancestor of the modern dinoflagellate *Pyrodinium bahamense* Plate, 1906; Micropaleontology, v.22, p.347-351, pl.1.

Mehrotra, N.C.

1981: Fossil dinoflagellates from subcrop Garampani Limestone sediments of Garampani area in North Cachar Hills, Assam; Geoscience Journal, v.2, p.13-22, pl.1.

1983: Palynology of the Mikir Formation in the type area; Geoscience Journal, v.4, no.1, p.1-34, pl.1-5.

Mehrotra, N.C. and Sarjeant, W.A.S.

1984a: Archeopyle type in the dinoflagellate cyst genus *Imbatodinium:* some new observations; Micropaleontology, v.30, no.2, p.213-222, pl.1-2.

1984b: *Dingodinium,* a dinoflagellate cyst genus exhibiting variation in archeopyle character; Micropaleontology, v.30, no.3, p.292-305, pl.1-4.

1984c: The dinoflagellate cyst genus *Polygonifera;* emendation and taxonomic stabilization; Journal of Micropalaeontology, v.3, no.1, p.43-53, pl.1-2.

Menéndez, C.A.

1965: Microplancton fósil de sedimentos terciarios y cretácicos del norte de Tierra del Fuego (Argentina); Ameghiniana, v.4, p.7-15, pl.1-3.

Merrill, J.A.

1895: Fossil sponges of the flint nodules in the Lower Cretaceous of Texas; Bulletin of the Museum of Comparative Zoology at Harvard College, (Geology Ser.III), v.28, p.1-26, pl.1.

Michael, E.

1964: Mikroplankton und Sporomorphe aus dem nordwestdeutschen Barrême; Mitteilungen aus dem Geologischen Institut T.H. Hannover, v.2, p.22-48.

Millioud, M.E.

1969: Dinoflagellates and acritarchs from some western European Lower Cretaceous type localities; *in* Bronnimann, P. and Renz, H.H. (eds.) Proceedings First International Conference Planktonic Microfossils Geneva, 1967, E.J. Brill, Leiden, v.2, p.420-434, pl.1-3.

Morbey, S.J.

1975: The palynostratigraphy of the Rhaetian Stage, Upper Triassic in the Kendelbachgraben, Austria; Palaeontographica, Abt.B, v.152, p.1-75, pl.1-19.

Morgan, R.

1975: Some Early Cretaceous organic-walled microplankton from the Great Australian Basin, Australia; Journal and Proceedings of the Royal Society of New South Wales, v.108, p.157-167, pl.1-3.

1977: Elucidation of the Cretaceous dinoflagellate *Diconodinium* Eisenack and Cookson, 1960, and related peridinioid species from Australia; Palynology, v.1, p.123-138, pl.1-2.

1980: Palynostratigraphy of the Australian Early and middle Cretaceous; Geological Survey of New South Wales, Palaeontology Memoir 18, p.1-153, pl.1-38.

Morgenroth, P.

1966a: Mikrofossilien und Konkretionen des nordwesteuropäischen Untereozäns; Palaeontographica, Abt.B, v.119, p.1-53, pl.1-11.

1966b: Neue in organischer Substanz erhaltene Mikrofossilien des Oligozäns; Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, v.127, p.1-12, pl.1-2.

1968: Zur Kenntnis der Dinoflagellaten und Hystrichosphaeridien des Danien; Geologisches Jahrbuch, v.86, p.533-578, pl.41-48.

1970: Dinoflagellate cysts from the Lias Delta of Lühnde/Germany; Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, v.136, p.345-359, pl.9-13.

Morzadec-Kerfourn, M.T.

1966: Etude des Acritarches et Dinoflagellés des sédiments vaseux de la Vallée de la Vilaine aux environs de Redon (Ille-et-Vilaine); Bulletin de la Société géologique et minéralogique de Bretagne, 1964-65, N.S., 137, pl.1-3.

Moshkovitz, S.

1979: On the distribution of *Schizosphaerella punctulata* Deflandre and Dangeard and *Schizosphaerella astraea* n. sp. in the Liassic section of Stowell Park Borehole (Gloucestershire) and in some other Jurassic localities in England; Eclogae Geologicae Helvetiae, v.72, no.2, p.455-465.

Muir, M.D., and Sarjeant, W.A.S.

1978: The palynology of the Langdale Beds (Middle Jurassic) of Yorkshire and its stratigraphical implications; Review of Palaeobotany and Palynology, v.25, p.193-239, pl.1-7.

Müller, C.

1976: Nannoplankton-Gemeinschaften aus dem Jung-Quartär des Golfes von Aden und des Roten Meeres; Geologie Jahrbuch, v.D17, p.33-77.

Nagy, E.

1965: The microplankton occurring in the Neogene of the Mecsek Mountains; Acta Botanica Académiae Scientiarum Hungaricae, v.11, p.197-216, pl.1-6.

1966: Investigations into the Neogenic microplankton of Hungary; Palaeobotanist, Lucknow, v.15, p.38-46, pl.1-2.

1969: Palynological elaborations in the Miocene layers of the Mecsek Mountains; A magyar Állami Földtani Intèzet Évokonyve, v.52, p.291-322, pl.1-9.

Neale, J.W. and Sarjeant, W.A.S.

1962: Microplankton from the Speeton Clay of Yorkshire; Geological Magazine, v.99, p.439-458, pl.19-20.

Newman, K.R.

1965: Upper Cretaceous-Paleocene guide palynomorphs from northwestern Colorado; University of Colorado Studies, Series in Earth Sciences, no.2, p.1-21, pl.1.

Norris, G.

1965: Archeopyle structures in Upper Jurassic dinoflagellates from southern England; New Zealand Journal of Geology and Geophysics, v.8, p.792-806.

1978: Phylogeny and a revised supra-generic classification for Triassic-Quaternary organic-walled dinoflagellate cysts (Pyrrhophyta). Part II. Families and sub-orders of fossil dinoflagellates; Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, v.156, p.1-30.

Norris, G. and Hedlund, R.W.

1972: Transapical sutures in dinoflagellate cysts; Geoscience and Man, v.4, p.49-56, pl.1-3.

Norris, G. and Jux, Y.

1984: Fine wall structure of selected Upper Jurassic gonyaulacystinean dinoflagellate cysts from southern England; Palaeontographica, Abt. B, v.190, p.158-168, pl.1-6.

Norris, G. and Sarjeant, W.A.S.

1965: A descriptive index of genera of fossil Dinophyceae and Acritarcha; New Zealand Geological Survey, Paleontological Bulletin, no.40, 72p.

Norvick, M.S.

1973: The microplankton genus *Disphaeria* Cookson and Eisenack emend; Bulletin of Australian Bureau of Mineral Resources, Geology and Geophysics, v.140, p.45-46.

Norvick, M.S. *in* Norvick, M.S. and Burger, D.

1976: Mid-Cretaceous microplankton from Bathurst Island in Palynology of the Cenomanian of Bathurst Island, Northern Territory, Australia; Australian Bureau of Mineral Resources, Geology and Geophysics, Bulletin 151, p.21-113.

Olaru, L.

1978: Forme noi de microflora din depozitele senoniene dintre Bistriţa şi Trotus (Carpatii Orientali); Analele Ştinţifice ale Universitáţii, Al. I. cuza din Iaşi (serie nouă), sectiunea IIb, Geologie, v.24, p.35-41, pl.1.

Oleinik, E.S.
1976a: Some new and little studied species *Peridineae* and green algae from Paleogene deposits of Tadzhikistan; Paleontologicheskii Sbornik no.13, p.84-90.

1976b: Some new and characteristic species of *Peridineae* from the Isfarinian-Khanabadian Beds (Upper Eocene) of Tadzhikistan.

Olsson, R.K. and Youssefnia, I.
1979: Cretaceous Calcisphaerulidae from New Jersey; Journal of Paleontology, v.53, p.1085-1093, pl.1-2.

Ostenfeld, C.H.
1903: Phytoplankton from the sea around the Faeröes; Botany of the Faeröes. II. Det Nordiske Forlag. Copenhagen, p.558-612.

Parke, D.L.
1974: Une nouvelle espèce de dinoflagellé siliceux; Revue de Micropaléontologie, v.17, p.81-85, pl.1.

Pastiels, A.
1948: Contribution à l'étude des microfossiles de l'Eocène belge; Mémoires du Musée Royal d'Histoire Naturelle de Belgique, no.109, p.1-77, pl.1-6.

Pflaumann, U. and Krasheninnikov, V.A.
1978: Cretaceous calcisphaerulids from D.S.D.P. Leg 41, eastern North Atlantic; *in* Lancelot, Y., Seibold, E., *et al.*, Initial Reports of the Deep Sea Drilling Project, Volume XLI, Washington, p.817-839, pl.1-8.

Philippot, A.
1949: Contributions à la paléontologie des silex crétacés. Trois nouveaux microfossiles; Bulletin de la Société Scientifique de Bretagne, v.24, p.55-58.

Piasecki, S.
1980: Dinoflagellate cyst stratigraphy of the Miocene Hodde and Gram Formations, Denmark; Geological Survey of Denmark, Bulletin, v.29, p.53-76, pl.1-6.

1984: Dinoflagellate cyst stratigraphy of the Lower Cretaceous Jydegård Formation, Bornholm, Denmark; Geological Survey of Denmark, Bulletin, v.32, p.145-161, pl.1-4.

Piel, K.M., and Evitt, W.R.
1980: Paratabulation in the Jurassic dinoflagellate genus *Nannoceratopsis* and a comparison with modern taxa; Palynology, v.4, p.79-104, pl.1-5.

Pierce, S.T.
1976: Morphology of *Schizosporis reticulatus* Cookson and Dettmann, 1959; Geoscience and Man, v.15, p.25-33, pl.1-2.

Pocock, S.A.J.
1962: Microfloral analysis and age determination of strata at the Jurassic-Cretaceous boundary in the western Canada plains; Palaeontographica, Abt.B, v.111, p.1-95, pl.1-15.

1972: Palynology of the Jurassic sediments of western Canada. Part 2. Marine species; Palaeontographica, Abt.B, v.137, p.85-153, pl.22-29.

Pocock, S.A.J., and Sarjeant, W.A.S.
1972: Partitomorphitae, a new subgroup of Triassic and Jurassic acritarchs; Geological Society of Denmark, Bulletin, v.21, p.346-357, pl.1-3.

Pöthe de Baldis, E.D.
1966: Microplancton del Terciario de Tierra del Fuego; Ameghiniana, v.4, p.219-228, pl.1-2.

Pöthe de Baldis, E.D. and Ramos, V.
1983: Dinoflagelados del Aptiano inferior de Rio Fosiles, Lago San Martin, Provincia de Santa Cruz, Argentina; Revista Espanola de Micropaleontologia, v.15, no.3, p.427-446, pl.1-4.

Rauscher, R. and Doubinger, J.
1982: Les dinokystes du Maestrichtien phosphaté au Maroc; Sciences Géologiques, v.35, no.3, p.97-116, pl.1-2.

Raynaud, J.F.
1978: Principaux dinoflagellés characteristiques du Jurassique supérieur d'Europe du Nord; Palinologia, 1, p.387-405, pl.1-2.

Reade, J.B.
1839: On some new organic remains in the Flint of Chalk; Ann. Nat. Hist. v.2, p.191-198, pl.8-9.

Regali, M.S.P., Uesugui, N., and Santos, Y.S.
1974: Palinologia dos sedimentos meso-cenozoicos do Brasil (II); Boletin Técnico da Petrobras, Rió de Janeiro, v.17, p.263-300, pl.1-25.

Reid, P.C.
1974: Gonyaulacacean dinoflagellate cysts from the British Isles; Nova Hedwigia, v.25, p.579-637, pl.1-4.

1977: Peridiniacean and Glenodiniacean dinoflagellate cysts from the British Isles; Nova Hedwigia, v.29, p.429-463, pl.1-4.

Riding, J.B.
1983: *Gonyaulacysta centriconnata* sp. nov., a dinoflagellate cyst from the Late Callovian and Early Oxfordian of eastern England; Palynology, v.7, p. 197-204, pl.1-2.

1984a: Observations on the Jurassic dinoflagellate cyst *Nannoceratopsis ambonis* Drugg, 1978; Journal of Micropalaeontology, v.3(1), p.75-79, pl.1.

1984b: A palynological investigation of Toarcian to early Aalenian strata from the Blea Wyke area, Ravenscar, North Yorkshire; Proceedings of the Yorkshire Geological Society, v.45, p.109-122.

Riegel, W.
1974: New forms of organic-walled microplankton from an Upper Cretaceous assemblage in southern Spain; Revista Espanola de Micropaleontologia, v.6, p.347-366, pl.1-3.

Riegel, W. and Sarjeant, W.A.S.
1982: Dinoflagellate cysts from the Upper Cretaceous of southern Spain: new morphological and taxonomic observations; Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, v.162, p.286-303, fig.1-8.

Riley, L.A.
1979: Dinocysts from the Upper Kimmeridgian (*pectinatus* Zone) of Marton, Yorkshire; Mercian Geologist, v.7, p.219-222.

Riley, L.A. and Fenton, J.P.G.
1982: A dinocyst zonation for the Callovian to Middle Oxfordian succession (Jurassic) of northwest Europe; Palynology, v.6, p.193-202.

Riley, L.A. and Sarjeant, W.A.S.
1972: Survey of the stratigraphic distribution of dinoflagellates, acritarchs and tasmanitids in the Jurassic; Geophytology, v.2, p.1-40.

Rögl, F.
1976: Danian Calcisphaerulidae of D.S.D.P. Leg 35, Site 323, south-east Pacific Ocean; *in* Hollister, C.D., Craddock, C., *et al.*, Initial Reports of the Deep Sea Drilling Project, Volume XXXV, Washington, p.701-711, pl.1-4.

Rossignol, M.
1961: Analyse pollinique de sédiments marins Quaternaires en Israël. I: Sédiments Récents; Pollen Spores, v.3, p.303-324, pl.1-2.

1962: Analyse pollinique de sédiments marins Quaternaires en Israël. II. Sédiments Pléistocènes; Pollen Spores, v.4, p.121-148, pl.1-2.

1963: Aperçus sur le développement des hystrichosphères; Bulletin du Muséum d'Histoire naturelle, Paris, sér.2, v.35, p.207-212, pl.1-2.

1964: Hystrichosphères du Quaternaire en Méditerranée orientale, dans les sédiments Pléistocènes et les boues marines actuelles; Revue de Micropaléontologie, v.7, p.83-99, pl.1-3.

Rozen, B.
1965: Contribution à l'étude des Hystrichosphères et Dinoflagellés du Bartonien belge; Société belge de Géologie, de Paléontologie et d'Hydrologie, v.73, p.287-318, pl.1-4.

Sah, S.C.D., Kar, R.K. and Singh, R.Y.
1970: Fossil microplankton from the Langpar Formation of Therriaghat, south Shillong Plateau, Assam, India; Palaeobotanist, Lucknow, v.18, p.143-150, pl.1-2.

Salujha, S.K. and Kindra, G.S.
1981: Palynological fossils from the Langpar Formation exposed along South Shillong Front, Meghalaya, India; Geoscience Journal, v.2, p.43-62, pl.1-3.

Salujha, S.K., Srivastava, N.C. and Rawat, M.S.
1969: Microforal assemblages from Subathu sediments of Simla Hills; Journal of the Palaeontological Society of India, v.12, p.25-40.

Samoilovich, S.R.
1961: *in* Samoilovich, S.R. and Mtchedlishvili, N.D. (eds.) 1961: Pyl'tsa i spory Zapadnoy Sibiri, Yura-Paleotsen; Trudy VNIGRI, v.177, 659p. (Pollen and spores of Western Siberia, Jurassic-Paleocene).

Sarjeant, W.A.S.
1959: Microplankton from the Cornbrash of Yorkshire; Geological Magazine, v.96, p.329-346, pl.13.

1960a: New hystrichospheres from the Upper Jurassic of Dorset; Geological Magazine, v.97, p.137-144, pl.6.

1960b: Microplankton from the Corallian Rocks of Yorkshire; Proceedings of the Yorkshire Geological Society, v.32, p.389-408, pl.12-14.

1961a: Microplankton from the Kellaways Rock and Oxford Clay of Yorkshire; Palaeontology, v.4, p.90-118, pl.13-15.

1961b: *Systematophora* Klement and *Polystephanosphaera* Sarjeant; Journal of Paleontology, v.35, p.1095-1096.

1962a: Microplankton from the Ampthill Clay of Melton, south Yorkshire; Palaeontology, v.5, p.478-497, pl.69-70.

1962b: Upper Jurassic microplankton from Dorset, England; Micropaleontology, v.8, p.255-268, pl.1-2.

1963a: *Favilarnax,* new genus of Mesozoic hystrichospheres; Journal of Paleontology, v.37, p.719-721.

1963b: Fossil dinoflagellates from Upper Triassic sediments; Nature, v.199, p.353-354.

1963c: Two new Jurassic species of *Gonyaulax* (Dinophyceae); Revue de Micropaléontologie, v.6, p.85-88, pl.1.

1964a: Hystrichosphere synonyms: *Favilarnax* Sarjeant junior to *Valensiella* Eisenack; Journal of Paleontology, v.38, p.172-173.

1964b: Taxonomic notes on hystrichospheres and acritarchs; Journal of Paleontology, v.38, p.173-177.

1964c: New name and diagnosis for an Upper Jurassic species of *Gonyaulacysta* (Dinophyceae); Palaeontology, v.7, p.472-473.

1965: Microplankton from the Callovian (*S. calloviense* Zone) of Normandy; Revue de Micropaléontologie, v.8, p.175-184, pl.1.

1966a: The "supposed sponge" spicules of Merrill, 1895, from the Lower Cretaceous (Albian) of Texas; Breviora, v.242, p.1-15, pl.1.

1966b: Dinoflagellate cysts with *Gonyaulax*-type tabulation; *in* Davey, R.J., Downie, C., Sarjeant, W.A.S., and Williams, G.L., Studies on Mesozoic and Cainozoic dinoflagellate cysts; Bulletin of the British Museum (Natural History) Geology, Supplement 3, p.107-156.

1966c: Further dinoflagellate cysts from the Speeton Clay; *in* Davey, R.J., Downie, C., Sarjeant, W.A.S., and Williams, G.L., Studies on Mesozoic and Cainozoic dinoflagellate cysts; Bulletin of the British Museum (Natural History) Geology, Supplement 3, p.199-214.

1967a: The stratigraphical distribution of fossil dinoflagellates; Review of Palaeobotany and Palynology, v.1, p.323-343.

1967b: The genus *Palaeoperidinium* Deflandre (Dinophyceae); Grana Palynologica, v.7, p.243-258.

1968: Microplankton from the Upper Callovian and Lower Oxfordian of Normandy; Revue de Micropaléontologie, v.10, p.221-242, pl.1-3.

1969: Taxonomic changes; *in* Davey, R.J., Downie, C., Sarjeant, W.A.S., and Williams, G.L., Appendix to "Studies on Mesozoic and Cainozoic dinoflagellate cysts"; Bulletin of the British Museum (Natural History) Geology, Appendix to Supplement 3, p.7-15.

1970: The genus *Spiniferites* Mantell, 1850 (Dinophyceae); Grana, v.10, p.74-78.

1972: Dinoflagellate cysts and acritarchs from the Upper Vardekløft Formation (Jurassic) of Jameson Land, East Greenland; Kommissionen for Videnskabelige Undersøgelser i Grønland, v.195, p.1-69, pl.1-9.

1975a: Jurassic dinoflagellate cysts with epitractal archeopyles. A reconsideration; Grana, v.14, p.49-56, pl.1-3.

1975b: ***Hapsidaulax***, new genus of dinoflagellate cysts from the Jurassic (Bathonian) of the Isle of Skye; Scottish Journal of Geology, v.11, p.143-149, pl.1-2.

1976a: Dinoflagellate cysts and acritarchs from the Great Oolite Limestone (Jurassic: Bathonian) of Lincolnshire, England; Géobios, no.9, p.5-45, pl.1-6.

1976b: *Energlynia*, new genus of dinoflagellate cysts from the Great Oolite Limestone (Middle Jurassic: Bathonian) of Lincolnshire, England; Neues Jahrbuch für Geologie und Paläontologie, Monatshefte, p.163-173.

1976c: English Jurassic dinoflagellate cysts and acritarchs: a re-examination of some type and figured specimens; Geoscience and Man, v.15, p.1-24, pl.1-7.

1978a: A guide to the identification of Jurassic dinoflagellate cysts; School of Geoscience, Louisiana State University, Miscellaneous Publication 78-1, p.1-107.

1978b: *Arpylorus antiquus* Calandra, emend., a dinoflagellate cyst from the Upper Silurian; Palynology, v.2, p.167-179, pl.1-4.

1980a: Restudy of a 19th-Century dinoflagellate cyst holotype from the Polish Upper Jurassic; Acta Palaeontologica Polonica, v.25, p.279-285, pl.37.

1980b: A restudy of some dinoflagellate cyst holotypes in the University of Kiel collections. 1. The Jurassic holotypes of Walter Wetzel (1966a,b); Meyniana, v.32, p.113-128, pl.1-3.

1981: A restudy of some dinoflagellate cyst holotypes in the University of Kiel Collections II. The Eocene holotypes of Barbara Klumpp (1953); with a revision of the genus *Cordosphaeridium* Eisenack, 1963; Meyniana, v.33, p.97-132, pl.1-6.

1982: The dinoflagellate cysts of the *Gonyaulacysta* group: a morphological and taxonomic study; American Association of Stratigraphic Palynologists, Contributions Series, no.9, p.1-80, pl.1-12.

1983: A restudy of some dinoflagellate cyst holotypes in the University of Kiel Collections IV. The Oligocene and Miocene holotypes of Dorothea Maier (1959); Meyniana, v.35, p.85-137, pl.1-7.

1984a: A restudy of some dinoflagellate cysts and an acritarch from the Malm (Upper Jurassic) of southwest Germany; Palaeontographica, Abt. B, v.191, p.154-177, pl.1-4.

1984b: Restudy of some dinoflagellate cysts from the Oligocene and Miocene of Germany; Journal of Micropalaeontology, v.3, no.2, p.73-94, pl.1-4.

1984c: A restudy of some dinoflagellate cyst holotypes in the University of Kiel Collections V. The Danian (Palaeocene) Holotypes of Walter Wetzel (1952, 1955); Meyniana, v.36, p.121-171, pl.1-8.

Sarjeant, W.A.S. and Anderson, R.Y.
1969: A re-examination of some dinoflagellate cysts from the uppermost Lewis Shale (Late Cretaceous) New Mexico (U.S.A.); Review of Palaeobotany and Palynology, v.9, p.229-237, pl.1.

Sarjeant, W.A.S. and Downie, C.
1982: The Upper Cretaceous dinoflagellate cyst *Raphidodinium* Deflandre: a restudy; Grana, v.21, p.115-120.

Sarjeant, W.A.S., and Stover, L.E.
1978: *Cyclonephelium* and *Tenua:* a problem in dinoflagellate cyst taxonomy; Grana, v.17, p.47-54.

Schopf, J.W.
1968: Microflora of the Bitter Springs Formation, Late Precambrian, Central Australia; Journal of Paleontology, v.42, p.651-688.

Schrank, F. von P.
1793: Mikroskopische Wahrnehmungen; Der Naturforscher, v.27, p.26-37, pl.3.

Schumacker-Lambry, J.
1978: Palynologie du Landenien inférieur (Paléocene) à Gelinden-Overbroek/Belgique. Relations entre les microfossiles et le sédiment; Laboratoire de Paléobotanique et de Paléopalynologie (éd.), Université de Liege, p.1-157, pl.1-18.

Scott, D.B., Mudie, P.J., Vilks, G. and Younger, D.C.
1984: Latest Pleistocene-Holocene paleoceanographic trends on the continental margin of eastern Canada: Foraminiferal, dinoflagellate and pollen evidence; Marine Micropaleontology, v.9, p.181-218, pl.1.

Singh, Ch.
1964: Microflora of the Lower Cretaceous Mannville Group, east-central Alberta; Research Council of Alberta, Bulletin 15, 239 p., pl.1-29.

1971: Lower Cretaceous microfloras of the Peace River area, northwestern Alberta; Research Council of Alberta, Bulletin 28, p.301-542, pl.39-80.

1983: Cenomanian microfloras of the Peace River area, northwestern Alberta: Alberta Research Council, Bulletin 44, p.1-322, pl.1-62.

Song Zhi-chen and He Cheng-quan
1982: Reassignment of several *Deflandrea* species from the coastal region of Bohai; Acta Palaeontologica Sinica, v.21, no.6, p.735-736.

Srivastava, N.C. and Banerjee, D.
1969: Hystrichosphaerids from Tertiary subcrops of Assam, India; J. Sen Memorial Volume, p.101-108, pl.1.

Srivastava, S.K.
1984: Barremian dinoflagellate cysts from southeastern France; Cahiers de Micropaléontologie, 1984-2, ed. C.N.R.S., p.1-90, pl.1-39.

Stafleu, F.A.
1983: International Code of Botanical Nomenclature adopted by the Thirteenth International Botanical Congress, Sydney, August 1981 (Utrecht, 1983), Regnum vegetabile, v.III.

Stanley, E.A.
1965: Upper Cretaceous and Paleocene plant microfossils and Paleocene dinoflagellates and hystrichosphaerids from northwestern South Dakota; Bulletin of American Paleontology, v.49, p.179-384, pl.19-49.

Stein, F.R. von
1878: Der Organismus der Infusionsthiere nach eigenen Forschungen in systematischer Reihenfolge bearbeitet. Abteilung III. Die Naturgeschichte der Flagellaten oder Geisselinfusorien. Hälfte I. Der noch nicht abgeschlossenen allgemeinen Teil nebst Erklärung der sämmtlichen Abbildungen enthaltend. Wilhelm Engelmann, Leipzig. x+154p., 24pl.

1883: Der Organismus der Infusionsthiere nach eigenen Forschungen in systematischer Reihenfolge bearbeitet. Abteilung III, Hälfte II, Die Naturgeschichte der arthrodelen Flagellaten; Wilhelm Engelmann, Leipzig. 30p., 25pl.

Stone, J.F.
1973: Palynology of the Almond Formation (Upper Cretaceous) Rock Springs Uplift, Wyoming; Bulletin of American Paleontology, v.64, no.278, p.1-135, pl.1-20.

Stover, L.E.
1966: *Nannoceratopsis spiculata*, a new dinoflagellate species from the Middle Jurassic of France; Journal of Paleontology, v.40, p.41-45, pl.8.

1974: Palaeocene and Eocene species of *Deflandrea* (Dinophyceae) in Victorian coastal and offshore basins, Australia; Special Publications of the Geological Society of Australia, no.4, p.167-188, pl.1-5.

1975: Observations on some Australian Eocene dinoflagellates; Geoscience and Man, v.11, p.35-45, pl.1-3.

1977: Oligocene and Early Miocene dinoflagellates from Atlantic Corehole 5/5B, Blake Plateau; American Association of Stratigraphic Palynologists, Contributions Series, no.5A, p.66-89, pl.1-3.

Stover, L.E. and Evitt, W.R.
1978: Analyses of pre-Pleistocene organic-walled dinoflagellates; Stanford University Publications, Geological Sciences, v.15, p.1-300.

Stover, L.E., Sarjeant, W.A.S., and Drugg, W.S.
1977: The Jurassic dinoflagellate genus *Stephanelytron:* emendation and discussion; Micropaleontology, v.23, p.330-338, pl.1.

Stradner, H.
1961: Vorkommen von Nannofossilien im Mesozoikum und Alttertiär; Erdöl-Zeitung, v.77, p.77-88.

Sverdlove, M.S. and Habib, D.
1974: Stratigraphy and suggested phylogeny of *Deflandrea vestita* (Brideaux) *comb. nov.* and *Deflandrea echinoidea* Cookson and Eisenack; Geoscience and Man, v.9, p.53-62, pl.1.

Takahashi, K.
1979: Phytoplankton from the Upper Cretaceous Quiriquina Formation, central Chile; Bulletin of Faculty of Liberal Arts, Nagasaki University, Natural Science, v.19, p.31-37, pl.1.

Tangen, K., Brand, L.E., Blackwelder, P.L. and Guillard, R.R.L.
1982: *Thoracosphaera heimii* (Lohmann) Kamptner is a dinophyte: observations on its morphology and life cycle; Marine Micropaleontology, v.7, p.193-212.

Tappan, H.
1980: The Paleobiology of Plant Protists; Freeman, San Francisco, 1028p.

Tasch, P.
1963: Hystrichosphaerids and dinoflagellates from the Permian of Kansas; Micropaleontology, v.9, p.332-336, pl.1.

1964: *In* Tasch, P., McClure, K., and Oftedahl, O., Biostratigraphy and taxonomy of a hystrichosphere-dinoflagellate assemblage from the Cretaceous of Kansas; Micropaleontology, v.10, p.189-206, pl.1-3.

Traverse, A.
1955: Pollen analysis of the Brandon lignite of Vermont; United States Bureau of Mines, Report of Investigations, no.5151, 107 p.

Troncoso, A. and Doubinger, J.
1980: Dinoquistes (Dinophyceae) del limite Cretacico-Terciario del Pozo El Ganso No. 1 (Magallanes, Chile). Actas del 2. Congreso Argentino de Paleontologica y Bioestratigrafia y 1. Congreso Latinoamericano de Paleontologia, v.2, p.93-125, pl.1-3.

Valensi, L.
1947: Note préliminaire à une étude des microfossiles des silex jurassiques de la région de Poitiers; Comptes rendus de l'Académie des sciences, Paris, v.225, p.816-818.

1948: Sur quelques microorganismes planctoniques des silex du Jurassique moyen du Poitou et de Normandie; Bulletin de la Société géologique de France, sér.5, v.18, p.537-550.

1953: Microfossiles des silex du Jurassique moyen. Remarques pétrographiques; Mémoir de la Société géologique de France, no.68, 100 p., pl.1-16.

1955a: Sur quelques microorganismes des silex crétacés du Magdalénien de Saint-Amand (Cher); Bulletin de la Société géologique de France, sér.6, v.5, p.35-40.

1955b: Etude micropaléontologique des silex du Magdalénien de Saint-Amand (Cher); Bulletin de la Société préhistorique française, v.52, p.584-596, pl.1-5.

van Helden, B.G.T.
1977: Correlation of microplankton assemblages with ammonite faunas from the Jurassic Wilkie Point Formation, Prince Patrick Island, District of Franklin; Geological Survey of Canada, Paper 77-1B, p.163-171, pl.33.1-33.2.

Varma, C.P. and Dangwal, A.K.
1964: Tertiary hystrichosphaerids from India; Micropaleontology, v.10, p.63-71, pl.1-2.

Villain, J.-M.
1975: "Calcisphaerulidae" (incertae sedis) du Cretacé supérieur du Limbourg (Pays-Bas) et d'autres regions; Palaeontographica, Abt. A, v.149, p.193-242, pl.33-41.

1977: Les Calcisphaerulidae: Architektures, calcification de la paroi et Phylogenèse; Palaeontographica, Abt. A, v.159, p.139-177, pl.42-47.

Vozzhennikova, T.F.
1960: Paleoalgologicheskaya kharakteristika Mezokaynozoyskikh otlozheniy Zapadno - Sibirskoy Nizmennosti; Akad. Nauk SSSR, Sib. Otd., Inst. Geol. Geofiz., Tr., v.1, Vop. Strat. Paleontol. Zap. Sibiri, p.7-64, pl.3. (Paleoalgological characteristics of the Mesozoic-Cenozoic deposits of Western Siberia.)

1963: Pirrofitovye Vodorosli. (Phylum Pyrrhophyta); p.179-185; *in* Orlov, Yu.A (ed.) Osnovy Paleontologii 14. (Fundamentals of Paleontology.)

1965: Vvedenie v izuchenie iskopaemykh peridineevykh vodorosli; Akad. Nauk SSSR, Sib. Otd., Inst. Geol. Geofiz., Tr., 156 p. (Introduction to the study of fossil peridinian algae.)

1967: Iskopaemye peridinei yurskikh, melovykh i paleogenovykh otlozheniy SSSR; Akad. Nauk SSSR, Sib. Otd., Inst. Geol. Geofiz., Tr., 347 p., 121 pl. (Fossil peridinians of the Jurassic, Cretaceous and Paleogene deposits of the U.S.S.R.)

Wall, D.
1965a: Microplankton, pollen, and spores from the Lower Jurassic in Britain; Micropaleontology, v.11, p.151-190, pl.1-9.

1965b: Modern hystrichospheres and dinoflagellate cysts from the Woods Hole region; Grana Palynologica, v.6, p.297--314.

1967: Fossil microplankton in deep-sea cores from the Caribbean Sea; Palaeontology, v.10, p.95-123, pl.14-16.

Wall, D. and Dale, B.
1968a: Early Pleistocene dinoflagellates from the Royal Society borehole at Ludham, Norfolk; New Phytologist, v.67, p.315-326, pl.1.

1968b: Quaternary calcareous dinoflagellates (Calciodinellideae) and their natural affinities; Journal of Paleontology, v.42, no.6, p.1395-1408, pl.172.

1970: Living hystrichosphaerid dinoflagellate spores from Bermuda and Puerto Rico; Micropaleontology, v.16, p.47-58, pl.1.

1971: A reconsideration of living and fossil *Pyrophacus* Stein, 1883 (Dinophyceae); Journal of Phycology, v.7, p.221-235.

Wall, D., Dale, B. and Harada, K.
1973: Descriptions of new fossil dinoflagellates from the Late Quaternary of the Black Sea; Micropaleontology, v.19, p.18-31, pl.1-3.

Wall, D., Guillard, R.R.L., Dale, B., Swift, E. and Watabe, N.
1970: Calcitic resting cysts in *Peridinium trochoideum* (Stein) Limmermann, an autotrophic marine dinoflagellate; Phycologica, v.9, no.2, p.151-156.

Warren, J.S.
1973: Form and variation of the dinoflagellate *Sirmiodinium grossi* Alberti, from the Upper Jurassic and Lower Cretaceous of California; Journal of Paleontology, v.47, p.101-114, pl.1-3.

Weiler, H.
1956: Über einen Fund von Dinoflagellaten, Coccolithophoriden und Hystrichosphaerideen im Tertiär des Rheintales; Neues Jahrbuch für Geologie und Paläontologie, Monatshefte, v.104, p.129-147, pl.11-13.

1982: Ein fund von *Pithonella* sp., Einer kalkigen Dinoflagellaten-Zyste im fischschifter von Bremmelbach, Elsass; Sci. Geol. Bull., v.35, no.3, p.129-136, pl.1-2.

West, R.G.
1961: Vegetational history of the Early Pleistocene of the Royal Society borehole at Ludham, Norfolk; Proceedings of the Royal Society, Ser.B, v.155, p.437-453.

Wetzel, O.

1933a: Die in organischer Substanz erhaltenen Mikrofossilien des baltischen Kreide-Feuersteins mit einem sediment-petrographischen und stratigraphischen Anhang; Palaeontographica, Abt.A, v.77, p.141-188.

1933b: Die in organischer Substanz erhaltenen Mikrofossilien des baltischen Kreide-Feuersteins mit einem sediment-petrographischen und stratigraphischen Anhang; Palaeontographica, Abt.A, v.78, p.1-110, pl.1-7.

1940: Mikropaläontologische Untersuchungen an der obersenonen Kreide von Stevns Klint-Kridtbrud auf der dänischen Insel Seeland und an ihrem Feuerstein in geschiebekundlicher Hinsicht; Zeitschrift für Geschiebeforschung, v.16, p.118-156, pl.1-5.

1960: Eine neue Dinoflagellaten-Gruppe aus dem baltischen Geschiebefeuerstein; Schriften des Naturwissenschaftlichen Vereins für Schleswig-Holstein, v.31, p.81-86, pl.1.

1961: New microfossils from Baltic Cretaceous flintstones; Micropaleontology, v.7, p.337-350, pl.1-3.

Wetzel, W.

1952: Beitrag zur Kenntnis des dan-zeitlichen Meeresplanktons; Geologische Jahresberichte, Hannover, v.66, p.391-419, pl.A.

1955: Die Dan-Scholle vom Katharinenhof (Fehmarn) und ihr Gehalt an Planktonten; Neues Jahrbuch für Geologie und Paläontologie, Monatshefte, p.30-46.

1966: Charakteristik des marinen Planktons und Pseudoplanktons der Amaltheen-Schichten Deutschlands und Lotharingens; Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, v.124, p.313-326, pl.30-31.

1967: Mikroorganismen aus jurassischen und kretazischen Saurier-Gewöllen; Zeitschrift der deutschen geologischen Gesellschaft, v.116, p.867-874, pl.1-3.

White, H.H.

1842: On fossil Xanthidia; Microscopical Journal, London, v.11, p.35-40, pl.4.

Whitney, B.L.

1979: A population study of *Alterbia acutula* (Wilson) Lentin and Williams from the Maestrichtian (Upper Cretaceous) of Maryland; Palynology, v.3, p.123-128, pl.1.

Wiesner, H.

1936: Sur la découverte de Diatomées et autres microfossiles peu connus dans le Crétacé supérieur de la Bohême; Annales de Protistologie, v.5, p.151-155, pl.6-7.

Wiggins, V.D.

1969: Two Lower Cretaceous dinoflagellate species from Alaska; Micropaleontology, v.15, p.145-150, pl.1-2.

1972: Two new Lower Cretaceous dinoflagellate genera from southern Alaska (U.S.A.); Review of Palaeobotany and Palynology, v.14, p.297-308, pl.1-3.

1973: Upper Triassic dinoflagellates from arctic Alaska; Micropaleontology, v.19, p.1-17, pl.1-5.

1975: The dinoflagellate Family Pareodiniaceae: a discussion; Geoscience and Man, v.11, p.95-115, pl.1-5.

Wille, W., and Gocht, H.

1979: Dinoflagellaten aus dem Lias Südwestdeutschlands; Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen, v.158, p.221-258.

Williams, G.L.

1978: Palynological biostratigraphy, Deep Sea Drilling Project Sites 367 and 370; *in* Lancelot, Y., Seibold, E., *et al.*, Initial Reports of the Deep Sea Drilling Project, Volume XLI, Washington, p.783-815, pl.1-8.

Williams, G.L. and Downie, C.

1966a: The genus *Hystrichokolpoma; in* Davey, R.J., Downie, C., Sarjeant, W.A.S. and Williams, G.L., Studies on Mesozoic and Cainozoic dinoflagellate cysts; Bulletin of the British Museum (Natural History) Geology, Supplement 3, p.176-181.

1966b: *Wetzeliella* from the London Clay; *in* Davey, R.J., Downie, C., Sarjeant, W.A.S., and Williams, G.L., Studies on Mesozoic and Cainozoic dinoflagellate cysts; Bulletin of the British Museum (Natural History) Geology, Supplement 3, p.82-198.

1966c: Further dinoflagellate cysts from the London Clay; *in* Davey, R.J., Downie, C., Sarjeant, W.A.S., and Williams, G.L., Studies on Mesozoic and Cainozoic dinoflagellate cysts; Bulletin of the British Museum (Natural History) Geology, Supplement 3, p.215-235.

1969: Generic re-allocations, *in* Davey, R.J., Downie, C., Sarjeant, W.A.S. and Williams, G.L., Appendix to "Studies on Mesozoic and Cainozoic dinoflagellate cysts"; Bulletin of the British Museum (Natural History) Geology, Appendix to Supplement 3, p.17.

Wilson, G.J.

1967a: Some new species of Lower Tertiary dinoflagellates from McMurdo Sound, Antarctica; New Zealand Journal of Botany, v.5, p.57-83.

1967b: Microplankton from the Garden Cove Formation, Campbell Island; New Zealand Journal of Botany, v.5, p.223-240.

1967c: Some species of *Wetzeliella* Eisenack (Dinophyceae) from New Zealand Eocene and Paleocene strata; New Zealand Journal of Botany, v.5, p.469-497.

1968: Palynology of some Lower Tertiary coal measures in the Waihao District, south Canterbury, New Zealand; New Zealand Journal of Botany; v.6, p.56-62.

1973: Palynology of the middle Pleistocene Te Piki bed, Cape Runaway, New Zealand; New Zealand Journal of Geology and Geophysics, v.16, p.345-354.

1977: A new species of *Svalbardella* Manum (Dinophyceae) from the Eocene of New Zealand; New Zealand Journal of Geology and Geophysics, v.20, p.563-566.

1978: *Kaiwaradinium*, a new dinoflagellate genus from the Late Jurassic of North Canterbury, New Zealand; New Zealand Journal of Geology and Geophysics, v.21, p.81-84.

1984a: Two new dinoflagellates from the Late Jurassic of North Canterbury, New Zealand; Journal of the Royal Society of New Zealand, v.14, no.3, p.215-221.

1984b: A new Paleocene dinoflagellate cyst from the Chatham Islands, New Zealand; New Zealand Journal of Botany, v.22, p.545-547.

1984c: Some new dinoflagellate species from the New Zealand Haumurian and Piropauan stages (Santonian-Maastrichtian, Late Cretaceous); New Zealand Journal of Botany, v.22, p.549-556.

Wilson, G.J. and Clowes, C.D.
1980: A concise catalogue of organic-walled fossil dinoflagellate genera; New Zealand Geological Survey, Report no.92, 199p.

1982: *Arachnodinium*, a new dinoflagellate genus from the Lower Tertiary of Antarctica; Palynology, v.6, p.97-103, pl.1-2.

Wit, Rein de
1943: Hystrichosphaeridae uit Limburgsche vuursteen; Verhandelingen van het Geologisch-mijnbouwkundig Genootschap voor Nederland en Kolonien, v.13, p.363-392.

Wolfard, A. and Van Erve, A.W.
1981: *Crussolia deflandrei* nov. gen. et nov. sp., a dinoflagellate cyst from the Jurassic (Callovian-Lower Oxfordian) of Montagne Crussol, Rhône Valley, France; Review of Paleobotany and Palynology, v.34, p.321-329, pl.1-2.

Woloszyńska, Jadwiga
1928: Dinoflagellatae polskiego bałtyku i błot nad piaśnica; Archiwum Hydrobiologji i Rybactwa, v.3, p.153-278, pl.2-15.

Woollam, R.

1982: Observations on the Jurassic dinocyst genera *Energlynia* and *Wanaea;* Journal of Micropalaeontology, v.1, p.45-52, pl.1-2.

1983: A review of the Jurassic dinocyst genera *Ctenidodinium* Deflandre 1938 and *Dichadogonyaulax* Sarjeant 1966; Palynology, v.7, p.183-196, pl.1.

19 : Jurassic dinocysts from shallow marine deposits of the East Midlands, England; Journal, University of Sheffield Geological Society, v.7, p.243-261.

Yu Jingxian

1982: Late Jurassic to Early Cretaceous dinoflagellate assemblages of Eastern Heilongjiang Province, China; Bulletin of the Shenyang Institute of Geology and Mineral Resources, Chinese Academy of Geological Sciences, no.5, p.227-267, pl.1-8.

Yu Jingxian, Guo Zhengying and Mao Shaozhi

1983: Cretaceous palynological assemblages from the district south of the Songhua River; Professional Papers of Stratigraphy and Palaeontology, No.10; Chinese Academy of Geological Sciences. Geol. Publ. House, Peking, p.1-86, pl.1-30.

Yu Jingxian, Sun Mongrong, Sun Suying and Mao Shaozhi

1981: The characters of dinoflagellate and acritarch assemblages from the Dalangshan Formation and their age determination; Oil and Gas Geology, v.2, no.3, p.254-264, 1 plate.

Yu Jingxian and Zhang Wangping

1980: Upper Cretaceous dinoflagellate cysts and acritarchs of Western Xinjiang; Bulletin Chinese Academy of Geological Sciences, Series 1, v.2, no.1, p.93-119, pl.1-6.

Yun, H-S.

1981: Dinoflagellaten aus der Oberkreide (Santon) von Westfalen; Palaeontographica Abt.B, v.177, p.1-89, pl.1-16.